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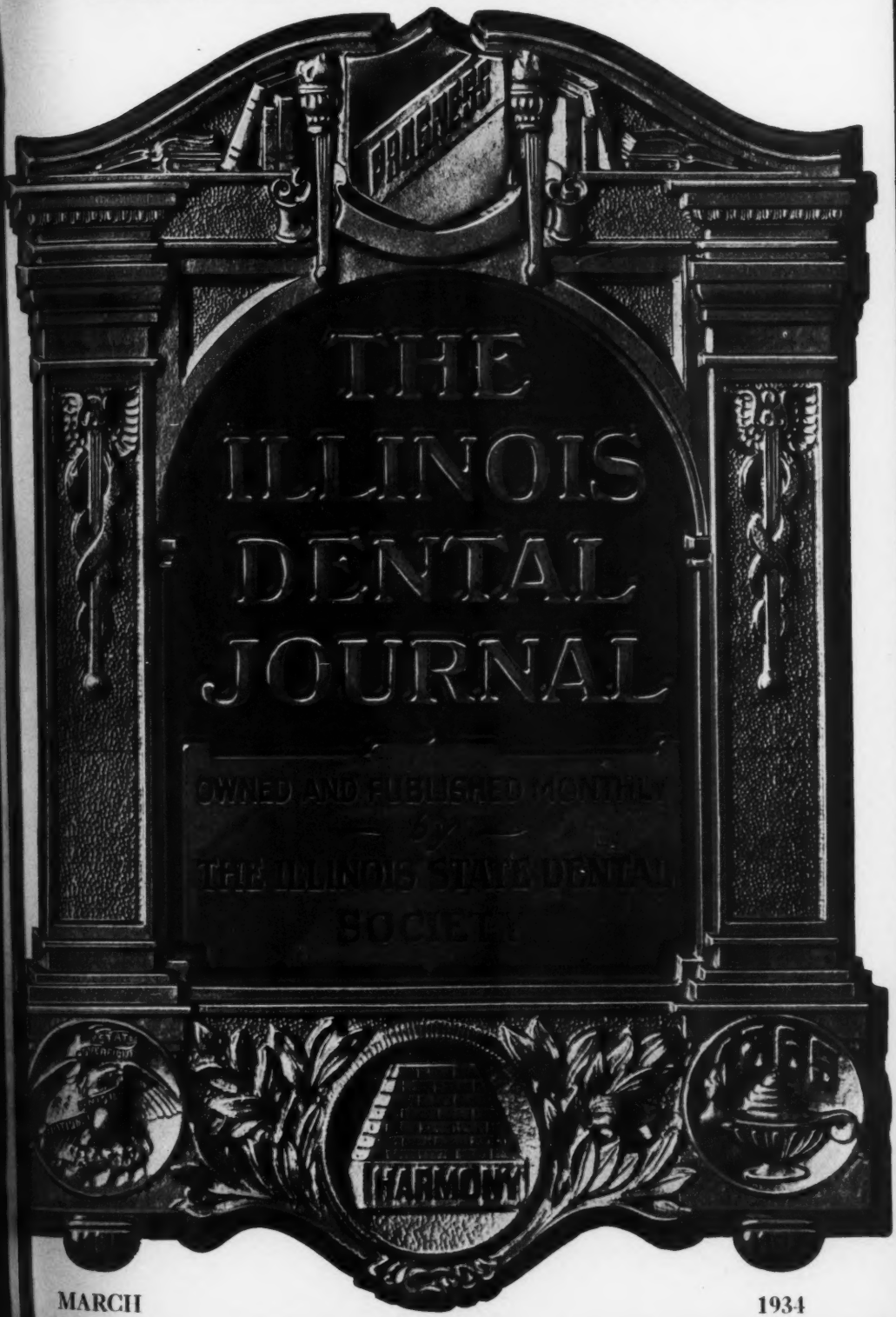

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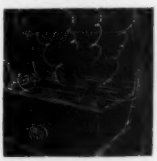

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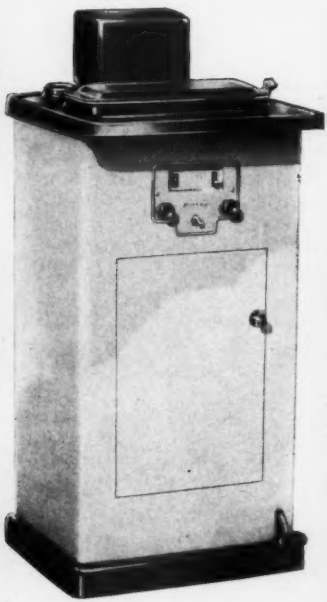

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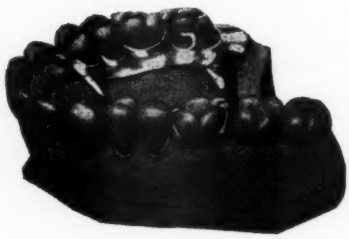

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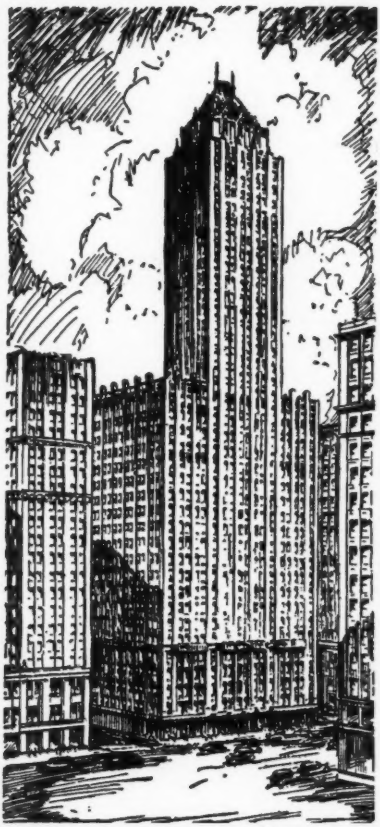

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CONTENTS

The Eruption of Human Teeth 89
By RUDOLPH KRONFELD, M.D.

Diagnosis of the Local Causes of Paradontal Lesions 92
By EDWARD C. WACH.

Vitamins and Minerals 99
By CARL NIELSEN.

News of the Annual State Meeting 116

Continued on Page VI

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CONTENTS—*Continued*

Editorials

The Benefit of Big Meetings 113

The Corbett Case 114

An Added Service 115

The Bureau of Public Relations 115

American Dental Association Meeting 121

The Forum 123

Society News and Announcements 129

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THE ILLINOIS DENTAL JOURNAL

Volume III March, 1934 Number 3

THE ERUPTION OF HUMAN TEETH

By RUDOLPH KRONFELD, M.D.*

THE ERUPTION of human teeth is one of the most interesting and complicated processes in the development of the human body. Every parent, dentist, and physician have watched the first set of teeth become more and more prominent under the ridges of the baby's jaws until finally, one day, a shiny tip of enamel appeared through the tissues. These deciduous teeth are then followed by the second set which resorb the roots of their temporary predecessors until the latter fall out and are replaced by the permanent dentition. Every dentist, in fact, every human being endowed with an interest in biologic processes has no doubt asked himself the question: What makes teeth erupt? Why do they move from within the jaw to the surface, and how do they make their way through the overlying bone and soft tissue?

It is surprising that the eruption of the human teeth did not *earlier* command the interest of scientists that it fully deserves. The ancient and *medieval* thinkers and writers were seemingly not interested in the mechanism of tooth eruption. Instead, their attention was entirely devoted to speculations as to the possible dangers and ill effects of *"teething,"* and some of these ideas even outlived the nineteenth century. It was left to modern medicine to disprove all the old stories that were once accepted by the medical profession as well as by the laymen. Today it is a fact established beyond any doubt that the eruption of the deciduous teeth is no more a dangerous or even potentially dangerous process than is the growth of hair or fingernails. Exact clinical and laboratory studies have shown that infectious and other childhood diseases reach their greatest frequency at the time of the first dentition, and also that many of these diseases *stimulate* tooth eruption. No wonder that the old physicians and midwives, who knew little or nothing about bacteria, vitamines, or infant feeding, claimed a causal relationship between conditions that sometimes occur simultaneously but which actually have no connection.

It was John Hunter, one of the greatest minds in the history of dental science, who took the first step toward a scientific interpretation of tooth eruption. His explanation of the eruptive mechanism was accepted and enlarged upon by numerous investigators; and is still one of the accepted theories. Since Hunter's time numerous other explanations of tooth eruption have been offered. I shall briefly enumerate them here, and then show how at present I am trying to approach this difficult problem.

The earliest explanation of tooth erup-

*From the Research Department of the Chicago College of Dental Surgery, Dental Department of Loyola University.

Read before the Illinois State Dental Society Meeting, Peoria, May 10, 1933.

tion, as given by Hunter, is the so-called *root elongation theory*. It is based upon the following fact: at the time of eruption, the crown is fully formed. The root, however, is still growing, and because of this continuous deposition of new hard tissue, dentin and cementum, at the open root end, the crown is forced upward until the overlying bone and soft tissue are resorbed and the crown erupts.

A similar explanation is offered by the so-called *pulp theory*. In this theory, the pressure of the massive pulp tissue at the root end is held responsible for the eruptive movement. The tooth is moved out of the alveolus by the pulp *pushing against* the bone at the bottom of the alveolus.

Both the root and the pulp theory are based upon forces that originate *within* the tooth itself. There are very important *objections* to both of these theories. Impacted teeth show occlusal movement of the crown after the root is fully developed. In new-born children erupted teeth have been observed that had no roots at all. During eruption the distance covered by the crown of a normal tooth is by far greater than the length of the root formed during the same period. Besides in both theories the bone at the fundus of the alveolus is considered the fixed point *against* which the tooth pushes during its occlusal movement. But we know that bone is not capable of playing such a role since it always reacts immediately to pressure and will invariably be resorbed rather than sustain force.

Faced with these objections, other investigators looked for the cause of eruption *outside* of the tooth itself. One theory was based upon the assumption that the erupting tooth is forced out of its socket granulation tissue at the fundus of the alevolus. A modification of this theory holds responsible for the eruptive movement the newly formed bone opposite the apical end of the tooth.

The apparent impossibility of any of these theories to explain the mechanism of eruption led to further search for a correct interpretation of the tissue changes. Thus, a French author, Delabarre, as early as 1819, considered tooth eruption a complex process, the three main components of which were supposed to be *increase* in the length of the root, bone *resorption* at the alveolar margin, and bone *formation* at the fundus of the alveolus.

When I studied the literature on this subject I was impressed by the fact that none of these investigators had what I would call suitable material for their studies. This latter statement calls for some additional comment. In old as well as present day textbooks on dental histology and embryology, the prenatal development of the teeth is usually illustrated with sections through fetal jaws of pigs, dogs, cats, or other animals; more recently sections through the jaws of human fetuses were used. For the ages *from birth on*, however, bone specimens (skulls) seem to have been practically the only source of information. Then the question arises: How much information concerning tooth eruption can be ascertained from a dried specimen of a skull, aged one, two, or three years? Such a specimen would, no doubt, show the actual position of the teeth and tooth germs at that particular time, but it can not

show the minute tissue changes which might explain the actual mechanism of eruptive movement.

After having given the problem considerable thought, I came to the following conclusion: If it is at all possible to determine the exact manner in which human teeth grow and erupt, this can be done only by studying sections through human specimens in which all tissues are *so* preserved that all minute changes in the hard and soft structures can be recognized. For this purpose we must have *human* specimens, because animal material is of limited value; after all we want to know how *human* teeth develop and erupt and not those of lower animals. Furthermore, sections must be available through *corresponding areas* of the jaw at as many different ages as possible. If such corresponding sections were then compared and perhaps superimposed, it would be possible to determine exactly what changes take place in size and position of any given tooth between birth and six months, between six months and the time of eruption, and so on. The microscopic study of these sections would give us information as to how the root grows, whether the root end *moves* or remains *stationary*, what bone changes take place at the *fundus* of the alveolus and at the alveolar *margin* during the eruptive period. By combining these individual items of knowledge thus gained, we could discover the part played by these various factors.

The histologic material for this study is the same as that used by Dr. Logan and myself in our recent report (J.A.D.A., March, 1933), in which there is a detailed description of the material and of the various steps in the preparation of the histologic specimens. Suffice it here to say that the ages of the individuals from whom jaws were obtained by autopsy ranged from birth up to fifteen years. I confined my own investigations largely to the mandibles of these jaws, because in a labiolingual or buccolingual section through the mandible, the distance between the different points of interest can actually be measured.

My plan was as follows: If corresponding labiolingual or buccolingual sections through the same tooth in human mandibles at different ages are studied and compared, it must be possible to determine what changes take place between the various age intervals. Since, for instance, sections through human lower *central incisors* at birth, at the ages of two months, six months, one, two, three, four years, and so on are available, and since the actual size of the germs, their distance from the lower border of the mandible, the increase in height of the mandible itself can be measured in these sections the questions can be answered as to whether the tooth is moving *into* the jaw or *out* of it, whether the distance from the root end to the lower border of the mandible remains *constant*, or *increases*, or *decreases*. In addition, the distribution of the bone changes, namely resorption and deposition of bone around the germ, will disclose the changes in the relative position of germ and jaw.

(Slides were here shown to substantiate the findings.)

It is evident that each permanent tooth germ in the human mandible undergoes the following changes in growth and position between birth and the age when the permanent teeth reach the occlusal plane:

First: The permanent germ assumes a position farther and farther *below* the deciduous predecessor. For instance, the lower bicuspid germs are located at birth *above* (on the occlusal side of) the crowns of the deciduous molars. At the age of about one year they are found on the *lingual* side of the deciduous molars. At the age of two and three years, the bicuspid germs are in a still *lower* position, and finally at the age of four years, they are rather *close to the lower border* of the mandible.

Second: From this time on, the root begins to *elongate* by the addition of new hard tissues, dentin and cementum, at the apical end; thus the crown begins to rise while the root end remains stationary. At the same time the *height* of the jaw increases to accommodate the longer root.

Third: After a certain period—approximately one or two years before eruption—the germs begin to show *active movement* in the occlusal direction. This is indicated morphologically by a marked new formation of bone at the fundus of the alveolus, opposite the open root end. At the same time the elongation of the root continues; but since the rate of occlusal movement exceeds the rate of addition of new dental structure at the root end, the latter is raised above its previous position, and new bone fills in from below. This type of movement, the active occlusal extrusion of the tooth, is the same movement that is, for instance, observed in fully formed impacted teeth and in teeth without antagonists, *generally* whenever *fully developed* teeth *advance parallel to their long axis.*

Thus we may say that tooth eruption is a *complex process* in which at least three decidedly different stages can be distinguished. An early stage in which the germ gradually becomes more deeply embedded in the jaw by a growth of the surrounding bone; a later stage in which the crown moves occlusally by the elongation of the root, and finally the stage of actual eruption, during which both crown and root show an active occlusal movement away from the fundus of the bony socket that surrounds the apical end of the germ.

DIAGNOSIS OF THE LOCAL CAUSES OF PARADONTAL LESIONS*

By EDWARD C. WACH

THE VARIOUS phases of this subject have received an increased interest in the last few years. Because the etiologic factors have been observed and studied extensively, more favorable results in treatment have been accomplished.

Authorities on the subject convey the idea that still more must be expected from the general practitioner in the way of responsibility, interest, and attitude in coping with this disease. This is logical since the general practitioner encounters the most important stage of this disease at the onset. Also its early recognition and prevention largely preclude the treatment.

A. H. Merritt[1] in a paper on the

*Read before the Annual Meeting of the Illinois State Dental Society.

treatment of periodontoclasia states that "Every case in private practice so far advanced that it cannot be treated successfully by subgingival curettage is a confession of failure."

Again if we consider H. E. Friesell's[2] observation from carefully compiled statistics, the loss of teeth through diseases of the paradontal tissues is considerable. More teeth are lost after the age of twenty-five through this disease than from all other causes combined. Here then, we have an opportunity to conserve many teeth, if by observation and prevention the forces of destruction can be checked or limited.

It is probable that in general practice there has been a lack of importance attached to incipient lesions or a failure to observe conditions which may result in these lesions. Only after carefully observing the progress of destruction and to what extent it continues if unchecked, are we impressed with the necessity of constantly guarding the health of the paradontal tissues.

The local causes of paradontal lesions will be discussed briefly as they are related to: occlusion, loss of teeth, infection, calcareous deposits, proximal contact points, tooth form and mouth hygiene.

Occlusion

Injury to the paradontial tissues by the application of excessive stress through supra-occlusion of natural teeth and of artificial restorations is sometimes encountered. Slight inequalities in occlusion usually result in the ability of the tissues to favorably adapt themselves to this stimulation or new environment. Forces acting under occlusion are mostly intermittent and bone changes under such conditions are subject to "Wolf's Law of Bone Transformation."[3] Stated briefly, it is that living bone undergoes internal and external changes whenever the function of the bone is altered.

Stress[4] applied lingually or bucco-labially, if not excessive, stimulates the alveolar bone to undergo architectural reconstruction to meet the requirement of the amount and direction of force applied.

Oppenheim[5] believes when excessive labial or lingual force is applied no architectural reconstruction occurs as in above case. The bone remains very similar to normal, the paradontal membrane fibers are compressed to one-third their normal width and areas of thrombosis may be present. The interpretation[6] is that an alteration of blood vessels occurs, impairing the nutrition of the periosteum. There is no condition to stimulate and build new bone. Such conditions are the result of traumatic occlusion.

Force acting in an intra-alveolar direction does not necessarily have to be very excessive to cause a disturbance or acute inflammation of the paradontal tissues. The tissues principally affected are the alveolar bone, paradontal membrane, blood vessels and the pulp, which may die if the condition is not relieved.

Whether any prosthetic restoration is going to cause an excessive load on the periodontal tissues supporting it, is determined largely by its mechanical construction, the size and shape of the teeth, their axial position and the health and extent of the supporting tissues.

Axial position of the abutment teeth is important because of Nature's plan that the teeth should bear a definite relationship to their supporting structures. If

there is a great deviation from normal axial position, stress upon the teeth becomes destructive instead of physiologically constructive. To be specific, note the destruction on the mesial of badly tipped molars, or the pocket formation approximating procumbent incisors. Mere surface contacts of restorations limit the extent of lateral movement and may cause trauma. The surfaces of restorations should embody surface contact points to accommodate lateral movements.

The muscular force delivered in mastication is potentially the same; but by taking advantage of proper mechanical principles in the construction of bridges and other restorations, we can greatly minimize the stresses to which the paradontal tissues of the abutment teeth will be subjected. In a span from a molar to first bicuspid, the occlusal area of the pontics and crowns can be diminished by one-fourth to one-third and still maintain functional efficiency.[7]

This reduction is accomplished by bringing the buccal and lingual cusps nearer on the occlusal, establishing wide lingual embrasures and exaggerating the grooves to permit the food to escape readily after being crushed. On the other hand if the cusp points are placed so as to increase the area of the occlusal (Trapezoid) we correspondingly increase the stresses which are transmitted to the abutment tooth. It is further evidenced that the principle of fixation helps in the stabilization and support of weaker abutments.[8]

Many cantilever bridges about the bicuspid region present striking examples of excessive load. Often the destruction of the supporting tissues is so far advanced as to render the abutment tooth useless for any further reconstruction.

Tylman[9] reports a high percentage of favorable results in bone tissue response and of functional adaptability on the part of healthy tissues. In over one thousand cases of fixed bridge work under clinical and radiographic observation, where the tissues are subjected to force or stress above normal but not in sufficient degree to cause permanent injury, the result is a compensation or equilibrium. There is an increased calcification of the alveolar process in accordance with Wolf's Law.

NATURAL TEETH

The grinding down of minor inequalities in the occlusion of natural teeth to accomplish a balancing of occlusion has received considerable interest and comment. This practice has not met the approval of the majority of practitioners. Occlusion is the result of all the forces acting in mastication, hence the grinding down of high points here and there does not necessarily relieve the cause. Inclined planes of the cusps are curved surfaces and if any grinding is done this fact should be borne in mind. Incidently, this principle should be carried out in the occlusal surfaces of restorations.

Other conditions which may interfere with the occlusion of natural teeth are:

1. Abnormal form of tooth, particularly in the cases presenting a freak supra-occluding cusp.

2. In cases of uneven wear which will result in leaving a prominent cusp that will interfere with lateral occlusal movement.

3. Uneven planes of marginal ridges are sometimes encountered. Any of these might be the cause of occlusal stress which may be relieved by careful grinding.

Loss of Teeth

Premature loss of teeth is soon followed by the opening of contacts of the adjacent teeth or the drifting of some teeth into a mal-position.

Malposed teeth may be subject to occlusal trauma or so inclined on their axial planes that later they become useless for anchorages or bridge abutments. Pocket formation eventually results about these inclined teeth by the continual packing of food into the weakened or slightly opened contacts.

The premature loss of the lower first molar presents more possibilities for paradontal disturbances than the loss of any other tooth. Erupting early and being prone to destruction by caries, its loss often occurs when it is not possible to supplant it by restorative procedure. Often when such time has arrived, the second molar is so inclined on its axial position that restoration is not possible. Lack of contact between the second and third molar harbors food impactions producing an area of gingivitis. While loss of the lower molars is progressing the upper molar teeth are elongating, producing a series of weak proximal contacts which become the sites for impactions of food debris with subsequent areas of gingivitis which may result in pocket formation.

Infection as Related to Causes of Paradontal Lesions

Of importance are: Vincent's infection and a discussion of mouth flora which might possibly be considered under mouth hygiene. The theory that the etiology of pyorrhea, etc., is a specific infection has been abandoned. Enough might be said in reference to Vincent's infection to warrant its discussion as a separate subject. The diagnosis is important and is based on clinical symptoms supplemented by microscopic findings. Treatment depends largely on its character, whether it is acute with systemic symptoms, or chronic with only local manifestations. As it is now considered a communicable disease which has become more prevalent in the last few years, its early recognition is important.

By its markedly acute and rapid progress of destruction much of the paradontal tissues can be destroyed, thus producing areas for the accumulation of calculus and conditions more favorable for pocket formation.

The bacterial flora of the mouth vary and are subject to transient changes. The oral cavity seems to be a good incubator for bacteria. Organisms of various types of virulence have been isolated from cultures. We are all aware of the powers of absorption of the mucous membrane, e. g. topical anesthesia by cocaine or novacaine. It would seem possible therefore that in mouths where the practice of hygiene is constantly neglected a considerable amount of toxic products could be accumulated and absorbed. This may be, to some extent, a contributing local cause of a gradual recession of the gingivae.

Should the denuded area of any extensive case be plotted graphically, its size would present a considerable area

through which absorption of products of inflammation may take place. The possibility of introducing virulent infection through the mouth directly into the blood stream has been studied by F. B. Noyes.[10]

In mastication a slight injury in the normal soft tissues may force organisms through the epithelium into the underlying tissues, here the lymphatic system by its channel arrangement connecting to the sub-maxillary lymph glands filters out such organisms before they reach the blood stream.

Any suppurative process, continuing after pockets are once formed, may by constant disintegration of the epithelium beyond the normal gingival crevice expose the connective tissues and capillaries and thereby afford a port of entry. With such a gateway of infection the normal flora of the mouth is of little consequence, but that virulent transient types of organisms may thus gain entrance to the blood stream is important. (Noyes)[11].

DEPOSITS OF CALCULUS—POCKETS

The amount of destruction that occurs by the accumulation of unremoved calcareous deposits on teeth and its sequelae is a matter that at no time can be over-emphasized. Perhaps the time and effort spent in observing, removing and preventing the formation of calcareous deposits benefits the patient as much as the service rendered in any other branch of dentistry.

Our present conception of the ideal gingival crevice is a very shallow space beneath which a firmly adhering epithelial band forms an attachment to the enamel surface. When this crevice is deepened by the separation of this epithelial band from the enamel it becomes progressively difficult to maintain proper cleanliness of the gingival space. The clinician should recognize the value of a very shallow crevice and therefore avoid all injury to this tissue during operation. By careless operation the clinician may produce a separation between the epithelium and the tooth surface, thus causing the deepening of this crevice.

Salivary calculus deposits as observed by G. V. Black[12] are not considered the initial cause of pocket formation. Once a deposit occurs, accumulation continues in a gingival direction continuing apically with progressive absorption of all the tissues in its path unless the destruction is limited by its removal. No pocket can be demonstrated with exploring instruments following removal of salivary deposits. Such deposits are initiated about some irregularity of tooth or tissue form. These nidi must be observed and their location carefully recorded before treatment is begun. The record should be kept for reference at subsequent visits. Salivary calculus deposits occur first as very soft accumulations which are easily removed by proper mouth hygiene. This should be instituted as part of a preventive measure.

Serumal deposits[13] of calculus occur primarily on the enamel under the free margins of the gingiva or later on the cementum following the detachment of the paradontal fibers. The deposits may more or less completely encircle the tooth as a narrow, tenaciously adhering thin, dark band which, when located on the enamel, can be detected by the dark

appearance about the free margin of the gingivae. The chemical composition is thought to be the same as that of salivary calculus but physically it is more densely compact. Serumal deposits left undisturbed, produce first a gingivitis, later suppuration, and by this gradual but continuous process cause pocket formation which eventually accomplishes the destruction of the paradontal membrane. Hence, its early detection and removal is important.

Proximal Contact Points

The improper construction of proximal contact points in dental restorations frequently results in injury to paradontal tissue. The normal proximal contact of each tooth has a definite relation occluso-gingivally and bucco or labio-lingually, contacting as two curved surfaces. A major portion of dental restorations involve the restoration of these contacts. In operative procedures as inlays, foils and synthetics, little difficulty is encountered in reproducing the normal contour of lost tooth structure, but observations show that many gold crowns and extensive amalgam fillings fail to protect the gingeval tissues from injury.

Loss of inter-proximal space by caries of proximating teeth requires adequate separation for proper restoration. When this is accomplished, only the amount of lost tooth structure should be restored. Any increase of space added to loss of original tooth structure causes slight alteration in the occlusion through inclined plane relation and may become a source of trauma. Weak, flat. high, or low proximal contact points permit the lodgment and impaction of food to occur. Stringy meat fibers especially cause a slight or further separation, and this repeated process results in gingivitis which, if not relieved, eventually results in pocket formation.[14]

In many cases where the lack of contact is considerable, no gingivitis is present, since the food debris is not retained in larger spaces.

Improper contour of restorations is a source of much gingivitis and pocket formation. The gold shell crown and the large amalgam filling often present weak, flat,, too high or too low contacts, permitting gingivitis to occur by food impaction.

Uneven and excessive occlusal wear, extending to or beyond the normal contact points, is occasionally presented. In such cases nearly all the contacts are weakened and permit firm impactions of fibrous food with the occurrence of gingivitis.

Occasionally a contact which appears clinically normal will open under occlusal stress, permitting food debris to wedge between the teeth. More often this is due to some inequality of the occlusion and its cause can be corrected by observing the occlusion.

Tooth Form

Deviation from the normal in contour and form is observed frequently as the causative factor in periodontal injury. These injuries may be the result of occlusal stress of abnormal cusp form or the variation in coronal contour that does not prevent food from being forced into subgingival crevices. A striking example of pocket formation due to this cause is found on the lingual of upper anteriors when marginal ridges and cingulum of upper incisors have been worn

down to a flat surface, permitting food in mastication to be forcibly driven into the subgingival crevices. Deep pockets produced in such cases often result in tooth loss. The sharp edges of improperly constructed pontics of bridges and particularly those of cantilever bridges are often found impinging upon the gum tissue, producing irritation.

MOUTH HYGIENE

The practice of proper mouth hygiene accomplishes two useful purposes. One is the removal of infected food debris lodged on or about teeth, thereby reducing the number of organisms and freeing the investing tissue from the action of the toxic products of the bacteria accumulated in the debris. The other purpose is the stimulation of the tissues by a massage-like motion. The normal color of the investing tissue is uniform and ranges in light shades of pink. Any deviation in uniformity of color may be regarded as an indication of some form of irritation.

Authorities agree that diseases of the paradontal tissue are seldom recognized until after they have passed their initial stage, therefore any change in the color of the investing tissue would indicate that a lesion is progressing. The health of the paradontal tissue as planned by Nature is maintained by vigorous functional activity. The resistance and vitality of these or any other tissues is dependent upon a rich and ample circulation. When this function is considerbly lessened the circulation is also diminished and may become low enough in some cases as to have the terminal vessels border on congestion and inflammation.

The institution of artificial means to make up for the lack of vigorous function is accomplished by the massage method technique of the tooth brush. The free gingiva as well as the teeth may be subjected to injury by the daily horizontal method of brushing the teeth, especially if a hard abrasive is used. Instruction and knowledge concerning brush and method of using is no small item in the prevention of paradontal lesions. The patient may likewise bring about injury to the soft tissue by the misuse of tooth picks, dental floss or the use of harmful dentifrices.

A case may present with purely local or with systemic causes or they may overlap each other in various degrees. Systemic cases most often encountered are those of diabetes, lues, and conditions manifested as an endarteritis. Diabetic cases are important to the dental practitioner since they present an early and extensive interstitial alveolar bone resorption.[15] Unless the local treatment is accompanied by sugar control treatment the progress is not favorable. Diabetes is prevalent enough to necessitate its diagnosis in any phase of dental procedure.

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VITAMINS AND MINERALS

and Their Relation to Dentistry and Nutrition*

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MR. PRESIDENT, Gentlemen and Friends: I hope that whatever I may have to say to you will be, in part at least, new to you and of use to you.

My subject is that of nutrition, particularly as regards vitamins and minerals as related to dentistry. It would be too much of a presumption on my part to tell you, who are active in the dental profession and who undoubtedly have given a great deal of thought to the subject of nutrition, to what extent that relation exists. But I trust I may be able to point out some significant facts which will encourage you to study this relatively new and very important subject further—in your practice.

The science of nutrition has progressed with tremendous speed for the past ten or twenty years, much more rapidly and along sounder lines than prior to 1920, and for the last five or ten years it has found its way to the dentist so that he is confronted nearly every day with the question—"What is the proper nutrition for my individual patients?" The general public is becoming better informed on the fundamental importance of nutrition to health and is willing, at least in spirit, to cooperate with you for best results, but often the spirit is willing and the flesh is weak.

The individual has always been interested in health. I have here an advertisement from a paper published in 1833. It shows in a measure the contrast to what one would do today in an effort to improve one's general health and through it one's dental health. It reads as follows:

> "WANTED: For a family who has bad health; a sober, steady person in the capacity of doctor, surgeon, apothecary and man-midwife. He must occasionally act as a butler and dress hair and wigs. He will be required sometimes to read prayers and preach a sermon every Sunday. A good salary will be given."

Today we are less interested in hair and wigs, and butlers, perhaps, but we ARE very much concerned about our teeth.

The Abbott Laboratories has long been actively interested in the newer knowledge of nutrition and has done its best to contribute something of value to the general knowledge and the distribution of this knowledge of vitamins, minerals and other factors as related to nutrition, and to offer products of real value to the profession along this line.

Most, if not all, text books read that vegetables are "good" or "excellent" sources of Vitamin A, and they usually present tables of comparative values indicated by one, two or three pluses. One of the most interesting recent discoveries is that vegetables in fact do not contain Vitamin A but that they have in them minute amounts of a pigment

*Read before the Odontographic Society of Chicago.

called carotene which is related to Vitamin A. This pigment is responsible for the yellow color of many of our table vegetables, as for example carrots (from which it derives its name); but it is also present in green vegetables such as spinach, lettuce, etc. The relation of carotene to Vitamin A is such that it may be called "provitamin A" just as ergosterol is called "provitamin D," because, under certain conditions, it can be converted into Vitamin A.

Certain animals can utilize carotene as a source of Vitamin A because they are capable of converting it into Vitamin A in the liver. The particular breed of rat which is generally used in nutritional experiments can so convert it, and that precisely is what gave rise to the discovery of the relation between carotene and Vitamin A. Whether man can convert it in a similar manner and thus successfully utilize vegetables as a source of Vitamin A is problematical. Apparently not all animals can synthesize Vitamin A from it.

Recent clinical research by Hess, Lewis and Barenberg demonstrated carotenemia in all the children to whom carotene was fed, indicating that only a very minute amount of the carotene, if any at all, was converted into Vitamin A in the liver. Many instances are known of carotenemia in infants fed carrots in the daily diet.

Carotene is a hydrocarbon, Vitamin A is an unsaturated alcohol corresponding to one-half molecule of carotene. Vitamin A is perfectly colorless.

At a recent meeting of the American Chemical Society in Chicago, one of the guests of honor, Professor Karrer of the University of Zurich (Switzerland) reported his splendid work on the isolation, synthesis and chemical character of Vitamin A. We, by the way, furnished Professor Karrer with Haliver Oil for his studies. From it he was able to prepare almost chemically pure Vitamin A. Haliver Oil is unusually rich in this vitamin particularly when extracted from livers of halibut caught in the early spring. We have obtained Haliver Oil as high as 600 times the Vitamin A content of cod liver oil. Both Vitamin A and D are present in the unsaponifiable fraction of these fish liver oils. But while this fraction in Haliver Oil is only from nine to twelve times larger than that in cod liver oil, the Vitamin A potency of Haliver Oil exceeds that of cod liver oil by at least 80 to 150 times, and the Vitamin D potency by at least twelve to twenty-five times.

Professor Karrer not only isolated Vitamin A from Haliver Oil, but he determined its chemical structure and subsequently succeeded in synthesizing Vitamin A. He found that the oxidation of both Vitamin A and carotene resulted in geronic acid, showing that both contain beta-ionone in the molecule; and by starting his synthesis from beta-ionone he obtained a substance identical to the Vitamin A isolated from Haliver Oil.

Now what significance does Vitamin A have to the dentist? I am sure we all agree on the great value of Vitamin A in nutrition and health; and it is generally admitted that the reason for it is that Vitamin A somehow aids in preserving the integrity of the cells of the body. Certainly the absence of Vitamin A brings about abnormal cell structure and destruction of cells in many parts

of the body, and it is quite apparent that Vitamin A is particularly concerned with the maintenance of normal function of the more delicate membranes such as those of the respiratory tract, the urinary tract, the intestines, etc. These membranes apparently cannot maintain a first line of defense against infection in the absence of Vitamin A, because they are keratinized and break up.

In the past, Vitamin A has therefore been referred to as the "anti-infective" vitamin, the term originating in Great Britain, but while it is true that Vitamin A by improving nutrition increases health and thus aids in building up resistance to infection, it is no longer advisable to term it "anti-infective" because that term infers that Vitamin A establishes an immunity to bacteria, which apparently is not at all the case.

Improvement in general health and better resistance to infections are as important to the dentist as to the physician. What is good nutrition to the rest of the body is also good nutrition to the teeth. The denture must not be regarded as a piece of machinery set apart from the whole and needing specific and different nutrition.

Vitamin A may have much more to do with dental health than formerly realized. The recent work by Wolbach and Howe of Harvard University deserves a great deal of consideration. Working with rats and guinea pigs they reported that the initial effect of Vitamin A deficiency upon incisor teeth is upon the enamel organ, that the ameloblasts respond earliest to atrophy, then the remainder of the organ atrophies, and finally metaplasia, calcification or ossification occur. This is followed by atrophy of the odontoblasts and by absent or deficient denture formation. These authors conclude that "defective enamel formation and other poorly understood conditions in teeth, such as denticles, pulp bone and cementicles, may reasonably be regarded in the human as Vitamin A deficiency possibilities," and their observations indicate that "Vitamin A deficiency is the most important of the known vitamin deficiencies in its effect upon tooth formation."

Does this mean that the two pet vitamins in dentistry, D and C, will have to take a back seat for Vitamin A? I think not. There is no reason to believe that one nutritional factor, vitamin or otherwise, is more important to dental health than any other. It may be more dramatic in its effect. It may have been investigated more thoroughly or it may be deficient to a greater extent in the diet. But all of these nutritional factors are equally important and work together for good. It is natural for the research worker to choose one nutritional factor, concentrate on that alone and draw very impressive conclusions. But, if the whole story of nutrition were told, we should probably find that all nutritional factors are equally important and dramatic in their relation to health, dental or otherwise.

No one has a better opportunity of contributing to the knowledge of nutritional disorders than the dentist, for the teeth show striking reactions to certain nutritional disorders faster perhaps than any other part of the body.

The dentist is called upon to prescribe diets. In this connection it may be of interest to mention that the ordi-

nary table vegetables vary materially in carotene content when tested biologically in the usual manner. What is more striking, however, is the exceedingly low carotene content of these vegetables as compared with the true Vitamin A content of the fish liver oils in general and Haliver Oil in particular. Carrots, for example, contain only about 30 units per gram expressed as Vitamin A potency in rats. Spinach is higher, 50 units per gram; another vegetable, escarole, has been reported to contain 200 units per gram. The content varies, of course, with the soil and the season. Including butter in this comparison, it contains 30 to 50 units per gram. Butter, however, contains a mixture of carotene and Vitamin A, but there is no information available regarding the proportion of these two factors since they are very difficult to separate.

Even if we assume that the carotene in these foodstuffs can be converted one hundred per cent into Vitamin A, they are surprisingly poor as compared to Haliver Oil since this latter contains not less than 32,000 and sometimes as much as 200,000 units per gram of true Vitamin A*.

Another nutritional factor in which you are particularly interested is Vitamin D. Like Vitamin A it is a fat soluble vitamin and the two always occur together in nature. You know it in the form of natural Vitamin D in fish liver oils and in the form of Viosterol as well. Let me say first of all that Vitamin D is the nutritional factor that is most scarce in the average American diet, or in any diet, with the possible exception of calcium.

How are we to explain that for generations we have been able to get along on such minute amounts of Vitamin D as are present in our average diet, and a defective calcium supply on top of it? We may be "getting along," but is not the fact that only three per cent of the people in the United States are free from dental caries sufficient indication that we are just "getting along" but are not in as perfect health as we could and should be?

I need not go into detail regarding the importance and function of Vitamin D in its relation to calcium and phosphorus, for you are undoubtedly familiar with the close interrelationship of these three nutritional factors; but I have been particularly interested in some recent work on Vitamin D and its relation to calcium, phosphorus and the parathyroids. The part played by the parathyroids in calcium and phosphorus metabolism has always been a riddle. Perhaps the riddle has been explained, at least in part, by the work of Kozelka, Hart and Bohstedt**.

While calcium and phosphorous are generally distributed in the entire body, there are three principal places where they are especially needed, namely in the blood, in the bones and in the teeth. Vitamin D, calcium and phosphorus are essential for normal calcium and phosphorus metabolism. Good health depends not only upon their presence but upon the balance or the proper propor-

*Since this talk was presented an article by Clausen and McCoord has appeared in the Journal of the A. M. A. indicating that true Vitamin A as found in fish liver oil is more easily absorbed and utilized than is carotene.

**Kozelka, F. L.; Hart E. B., and Bohstedt, G.: Growth, Reproduction and Lactation in the Absence of the Parathyroid Glands J. Biol. Chem. 100: 715 (May) 1933.

tion of the three. Together they perform a metabolic function which is necessary to life. They constitute a trinity in the prevention of disorders of the teeth and of the bones and of other nutritional disorders.

The parthyroid hormone, on the other hand, is as far as we now know chiefly concerned in the regulation of the calcium and phosphorus level in the blood. It apparently is not instrumental in the deposition and adjustment of calcium and phosphorus in the teeth and bones. A deficiency of parathyroid hormone may cause tetany because of low calcium in the blood, but it does not perform a specific function in metabolism necessary to life. The authors whom I mentioned found that parathyroidectomized dogs can complete a life cycle and are capable of reproduction as long as sufficient amounts of calcium, phosphorus and Vitamin D are supplied.

In parathyroid deficiency the blood-calcium goes down unless greater amounts of calsium and phosphorus with Vitamin D are supplied. If Vitamin D, calcium and phosphorus are deficient in the diet, the parthyroid, in order to maintain a normal calcium level in the blood, will rob the teeth and the skeleton of calcium to put it in the blood, and the result is bone and tooth deficiency unless more calcium, phosphorus and Vitamin D is supplied to make up for it.

This condition is met with particularly during the period of pregnancy and lactation, when there is a much greater demand for these minerals to satisfy both mother and child; and unless adequate amounts of Vitamin D, calcium and phosphorus are furnished the parathyroid will perform its function at the expense of the skeleton and the teeth so that poor bone and tooth structure results.

The structure and chemical characteristics of Vitamin D may not be fully understood except by a chosen few, but it is safe to state that Vitamin D has been prepared in a chemically pure form. Its synthesis through ultraviolet irradiation of ergosterol is a fascinating story, too long to tell here, but I shall be glad to answer, if I can, any questions relating to it which you may wish to ask.

The interest Vitamin D holds for the dentist is well known and so evident that I need not dwell upon it, but in view of what I have said regarding Vitamin A and D, may I call your attention to the significant fact that these two vitamins always occur together in nature and that it is not unreasonable to assume that there is a close interrelationship in the functions of the two.

The latest regarding Vitamin B is perhaps that this water soluble vitamin has been prepared in a chemically pure form also. It is curious that this organic substance, besides carbon, hydrogen, oxygen and nitrogen, also has sulphur in its molecule. It is surprising that a compound of this structure present in such minute amounts in the diet has such a profound influence on the condition of health. If we let our imagination run along lines of future "medicine," it is not difficult to conceive of the elimination of artificial means of maintaining proper digestive function and proper elimination in poor modern man, for Vitamin B is evidently essential to normal appetite, normal intestinal function and general well-being. It is known

as the antineuritic vitamin because severe deficiency or absence of it is conducive to polyneuritis or beri-beri.

This condition is very uncommon if at all present in the United States; but before beri-beri can appear there is a long period of ill health due to Vitamin B deficiency in which common symptoms met with every day in medical practice occur. The origin of these may often be difficult to trace but on the basis of our knowledge of Vitamin B today it is quite certain that many of them may be ascribed to a lack of this vitamin in the diet. Such conditions as poor appetite, lack of vigor, gastro-intestinal derangements—indigestion, constipation, colitis and finally, nervous symptoms—certainly are very common and they are by no means insignificant to the dentist for they are most always accompanied by dental ill health.

Vitamin B is closely related to Vitamin G. At one time they were thought to be one and the same thing. When first identified as separate, distinct factors, they were called Vitamins B_1 and B_2 respectively and this terminology is still followed in British literature. In America they are called Vitamin B (for B_1) and Vitamin G (for B_2), the latter in honor of Goldberger—who discovered it. This group—the so-called B complex—now includes additional factors, B_3, B_4 and B_5, of which too little is known to warrant any comments at this time.

Just as Vitamins A and D accompany each other in natural fats and oils, so Vitamins B and G occur together in the aqueous fraction, and it is highly probable that they also are interrelated inso far as nutritional function is concerned. The liver is a storage plant for all these vitamins, but there is generally a greater variation in the Vitamin A and D content than in that of Vitamins B and G. The liver can store appreciable amounts of the fat soluble vitamins for emergency purposes.

Liver extract, which is the water soluble fraction of the liver, is therefore unusually rich in Vitamin B an G, containing more of these vitamins than any other available source, but it is devoid of Vitamins A and D. Liver extract is particularly high in Vitamin C content and is effective in pernicious anemia. It is most interesting that Strauss and Castle have pointed out the possibility of this effect being due to Vitamin G. They demonstrated that in liver extract there is an "extrinsic factor" which when acted upon by an "intrinsic factor" in normal gastric juice, is converted into the substance responsible for the recovery obtained in pernicious anemia. Pernicious anemia is due to immaturity and therefore to rapid destruction of the red blood corpuscles. If it is true that Vitamin G is the nutritional factor fundamentally responsible for the manufacture of normal blood corpuscles, then it is a nutritional factor of far reaching importance to general health and consequently of no less import to dental health. Again, if it is true, we may have to classify pernicious anemia among the increasing number of diseases now listed under the heading of nutritional disorders. Vitamin G thus becomes a nutritional factor not merely concerned in proper growth and prevention of pellagra, but fundamentally in the maintenance of normal blood. Perhaps we shall find, after all, that Vi-

tamin G in liberal amounts will preserve the characteristics of youth and longevity in man, as Sherman observed in experimental animals.

The third water soluble vitamin, the "antiscorbutic" Vitamin C, has been subjected to very extensive research during the past year or two. You know that orange, lemon and grapefruit juices are considered the best food sources for it, but several investigators have now called attention to certain vegetables which are equally desirable. Peppers, for example, contain appreciable amounts of this vitamin which has been christened "ascorbic acid" by Szent-Cyorgyi, who isolated it.

The leaves of the iris are high in Vitamin C content also. Szent-Gyorgyi, King and others have obtained this vitamin in pure crystalline form. Its structure has been determined, and some of our foremost chemists have been able to synthesize it from certain monosaccharides. It is to be hoped that pure Vitamin C will be available soon in sufficient amounts to determine its particular mission in nutrition and to answer the question whether the benefit derived from fruit juices in certain dental disorders is or not due to Vitamin C. It is logical to regard many of the conditions of soft and bleeding gums as localized scurvy and to expect Vitamin C, the antiscorbutic vitamin, to prevent and eliminate these conditions. It is also apparent that a normal condition of the inner soft structures of the teeth depend upon an adequate supply of this vitamin. Here again the dentist will have a splendid opportunity for clinical research along nutritional lines.

I have not mentioned Vitamin E because there is not a great deal known about its character and its relation to human nutrition. It has been called the "reproduction" vitamin because in the absence of it the experimental animal loses its capacity of reproduction. There can be little doubt of its specific function in the sexual mechanism but we must not forget that normal reproduction depends upon good general health and that many other nutritional factors, particularly vitamins, are equally as essential to it. Vitamin E is furthermore believed to be generously distributed in the average diet and thus should not present an urgent problem.

We have for many years studied these vitamins and we have made a particular effort to obtain the natural fat soluble vitamins in a convenient form. The liver oils of virtually every edible fish obtainable on the market, and many others not under this classification, have been investigated and bio-assayed for Vitamin A and D content. The practical result has been the production in our Seattle plant of Haliver Oil, the oil from the halibut liver, so rich in Vitamins A and D as to permit the administration of these two vitamins in drop doses instead of, as before, teaspoonful doses.

Haliver Oil never contains less than 32,000 Vitamin A units and 2,000 A.D.M.A. Vitamin D (200 Steenbock) units per gram. The United States Pharmocopoeia is at present considering the adoption of new A and D standards for cod liver oil. It is probable that it will require a minimum content of approximately 400 Vitamin A units per gram. The Vitamin D standard is still under discussion but it is generally agreed that

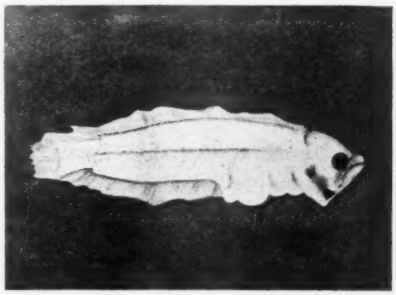
an average medicinal cod liver oil contains 200 A.D.M.A. Vitamin D units per gram, more or less. The new standards, however, will be expressed in international units, thus eliminating the confusion which exists in present-day terms of units. When these new standards are announced the Vitamin A and D content of the oil of the halibut, or as we term it, "Haliver Oil," will of course be expressed in international units also.

You will be interested in the character of this oil as well as in the fish from which it is derived.

The true halibut, Hippoglossus hippoglossus, is found in many oceanic waters, principally in the Pacific Ocean from the Bering Sea to San Francisco and occasionally farther south. It is the largest member of the flounder family. It spawns in the winter months, usually from November to February, during which time the halibut fishing season is closed according to the recommendation of the International Fisheries Commission.

The female halibut may carry from two hundred thousand to three million eggs at one time. It is estimated that she carries an average of fifteen million eggs in a lifetime. Statistics indicate that out of this number of potential halibut only two single individuals reach mature age.

The halibut egg is very small, probably not more than three and one-half millimeters in diameter. The newly hatched halibut is only about half an inch long, very frail and transparent. It is slender and ell-like in shape and without color. It floats around like most other fish larvae and has one large eye protruding on each side of the head. During the first few months of life it begins to change in appearance. It gradually flattens out to take the shape of a flounder and one eye "migrates" over next to the other so that both eyes presently are on one side of the head. This shifting of the eye is in all probability due to a more rapid growth on one side of the head than on the other. The eyed side of the body gradually takes on color, the other side remaining white and the fish now swims white-side-down instead of upright.



The growth of the halibut is very slow. A year-old halibut is only two and one-half to two and three-quarters inches long. Based upon the weights of small fish there is a popular belief that the average yearly increase in weight is approximately one pound. Growth, however, is by no means so simple. The females grow more rapidly than the males and the weight added each year increases throughout life. Males rarely exceed thirty pounds in weight but the catching of two hundred to four hundred pound females is not an unusual occurrence. The largest halibut on record weighed seven hundred and twenty pounds. Since two hundred

pound females range from thirty to forty years old it is reasonable to assume that the halibut reach considerably older ages comparable to those of man. The halibut on the average reaches maturity at the age of twelve years, but some do so as early as eight years.

The piscatologists have found a way of determining the age of the halibut with accuracy. A small bone formation located in the ear of the halibut is removed, freed from tissues and carefully cleaned. Placed under the microscope this ear bone shows a fresh deposit of crystalline calcium carbonate around the center for each year of the halibut's life. These narrow deposits form rings much like a transversal cut of a tree trunk. By counting the rings the age is determined.

The halibut lives close to the bottom of the deep sea and is usually fished from a depth of from fifty to two hundred fathoms. The temperature of these deep waters is quite close to the freezing point. Here the halibut feeds on smaller fish, crabs and shellfish of all kinds.

Although halibut has been fished for centuries, modern, large scale, commercial halibut fishing is a relatively new industry. The collecting of the livers is a new and valuable branch of this industry.

The fisherman has learned by many years of trying experience to choose and rig his boat for this specialized branch of fishing. The present-day halibut boat is surprisingly small for the fight against the elements expected from it. The average boat is perhaps forty feet long and is driven by a Diesel or gasoline engine. It is sturdily built and has quarters for the captain and five to eight men, including the cook. The hold occupies a large portion of the schooner, often having a capacity of from 30,000 to 50,000 pounds of fish on ice. The glass-enclosed pilot house is just large enough to accommodate the man at the helm.

Before leaving for the halibut banks, enough food is stored to last from two to three weeks; the fishing gear is put in order, the hold filled heaping full of crushed ice and a liberal amount of fresh or frozen herring obtained for bait.

The gear consist of seven to eight (or more) "skates," each consisting of heavy rope line about one-fourth inch in di-

ameter and 1,800 to 2,000 feet long. This main line which rests horizontally under the water has attached to it a large number of thinner, vertical lines, one for each thirteen to twenty-four inches. At the end of each of these is fastened a three-inch metal fish hook. Each "skate" requires two anchors and two buoys.

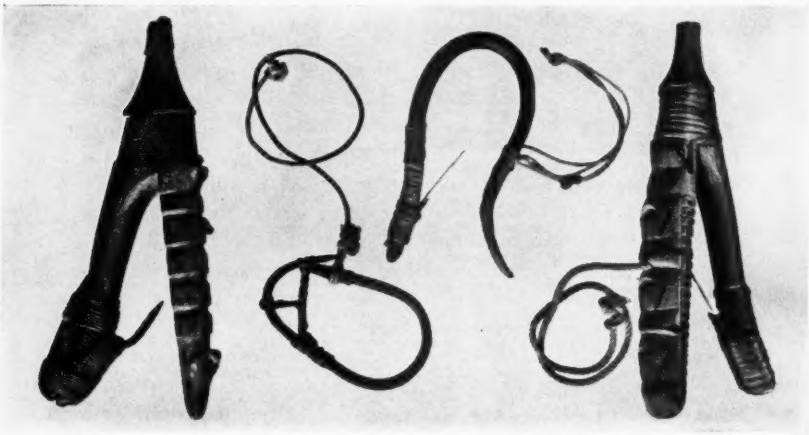
The fishing grounds are located at least fifty miles from shore. It often requires two to three days for the boat to reach a desirable spot because of the rocky and treacherous character of these waters.

On the way to the deep sea the crew is busy baiting hooks, several hundred in number. On arriving at the fishing grounds the lines are hauled out over the side of the boat, one after another, each end of the horizontal line being held down at the proper distance from the bottom by means of an anchor and connected by a vertical line to a buoy on the surface, each buoy carrying a flag. The lines are so placed that the hooks are about six inches from the bottom. It takes several hours to set these lines.

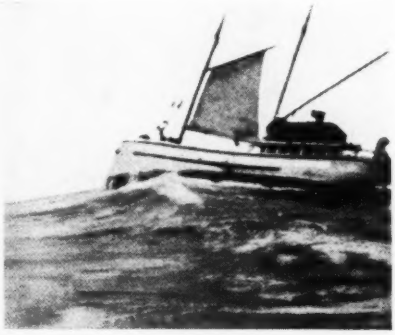
As soon as the last line has been set the boat returns to the first; here the halibut has had plenty of time to bite (if in the mood) and the fish is now hauled in over the railing. This is done by winding the line up on a motor-driven winch. As each halibut appears over the rail, it passes swiftly from hand to hand through the process of cleaning and dressing, and is immediately and carefully packed in the ice in the hold. Formerly the entrails were thrown overboard as waste, but now the liver is diligently removed, freed from other tissues, especially the gall bladder, rinsed and put in clean tin cans placed in ice.

Immediately upon arrival of the livers at the plant on the coast, they are examined and the oil then extracted by a special process which protects the vitamins against destruction. The oil is refined and stored in glass tanks in which the air has been replaced with carbon dioxid or nitrogen to protect the oil against oxidation.

The finished Haliver Oil is then subjected to purity and identity tests, and finally assayed for Vitamins A and D.



The colorimetric assay for Vitamin A using antimony trichloride serves as a preliminary index for Vitamin A content, but the ultimate standardization of Haliver Oil is always based upon subsequent biologic assays. The Vitamin A potency is determined by the U.S.P. method described under cod liver oil as modified by the A.D.M.A. Vitamin Committee. The Vitamin D content is established biologically by the so-called "line test" as modified by the same committee.



The liver represents only an average of 2% of the halibut and has a texture which is quite different from that of the cod. It is smaller in proportion to the size of the fish than the liver of the cod and its oil content is lower, more tightly held in the tissues, and more difficult to remove. Haliver Oil is a yellow clear liquid, low in acidity and quite similar in physical and chemical constants to cod liver oil except that the unsaponifiable fraction, and particularly the A and D content, is materially larger.

Before white man started to exploit the halibut, this fish was one of the most important foods of the Indian tribes along the northern Pacific Coast. Indian fishing for halibut probably dates back many centuries. The fish was then easily available in the narrow straits and bays close to the main land.

The Indians went out in primitive canoes and used hooks especially devised for the fishing of halibut. These hooks, though clumsy and crude as compared to the modern fish hook, were cleverly constructed and very efficient. The larger hooks are characteristic of the tribes in southeastern Alaska (the Thlinget Indians). They were made of two pieces of wood lashed together at an angle of about fifteen degrees and were often beautifully carved. To one of these pieces the line was attached and to the other a barb of bone or iron was firmly lashed by means of strong fiber. These wooden hooks measure from eight to fifteen inches in length. The bait was lashed back of the barb. The upper branch of the hook prevented the halibut from shaking loose and the fish was usually drowned before reaching the surface because of its inability to open and close the mouth sufficiently for breathing. If not dead the Indian killed it with a club specially made for the purpose.

The tribes in the Cape Flattery region make hooks from splints of hemlock knot, steamed inside the bulb of the giant kelp. The lines were made of twisted fiber, animal gut or of bleached and partly dried kelp, until white man introduced cotton lines. Stones served as sinkers and bladders or skins as material for floats.

The halibut was often cut in strips and dried in the houses for the winter when food was scarce and fishing uncertain. The dried fish was dipped in fish oil before eating. Fish oils have

always been and are today included in the diet of many of the Alaskan Indians. They prepare them either from the entire fish including the liver or from the liver itself. These oils are generally far richer in the fat soluble vitamins than any of the foodstuffs in our average diet. No one questions the fact that Vitamin D is available in only negligible amounts in the average American diet, too small for the maintenance of good health; but opinions are still divided regarding Vitamin A requirements. It is well to remember in that connection that many of these Indian tribes consume thousands of units of Vitamin A daily and that they are on the whole a strong and sturdy race. Along the coastline of Alaska one may still find the "greasy trails" where the Indians have carried their fish oils in leaking, primitive containers from the coast to their homes.

Many of the northern tribes prepared these fish oils by throwing the fish into the canoe, adding water, and throwing in hot stones to cook the mixture, then skimming the oil off the surface. This process had the additional advantage of making the canoe water-proof.

DISCUSSION

DR. BATES: I would like to ask about the physical makeup of these Indians, about their general health and the condition of their teeth.

MR. NIELSEN: While in Alaska I made no investigation along that line, but I shall be much interested to hear what Dr. Weston Price has to say about it. He has just returned from an Alaskan trip for the purpose of studying the conditions of the teeth of the Indian tribes.

DR. BATES: These hooks are made of wood. How do they control the depth? Did they use a sinker?

MR. NIELSEN: Yes. They used a stone for a sinker, and they were very successful with these hooks. In 1888 an Indian crew using wooden hooks fished alongside a white crew using the modern hook. The Indians caught the most halibut. Today modern halibut fishing is of course developed to a very superior technic.

DR. IDLER: Is the halibut a fighter?

MR. NIELSEN: It is not a very lively fish. It may be a fighter for all we know but it has no chance. The water at the bottom of the deep sea is very cold and the pressure very high. When caught on the hook and hoisted up it passes through water of higher temperature and the pressure is released; as a result the halibut loses all desire to act up.

DR. HASKINS: To what extent do fruits and vegetables enter into the diet in the life of the Alaskan Indians?

MR. NIELSEN: To a somewhat greater extent now than ten or twenty years ago, but the coast of Alaska is rocky and does not lend itself to agriculture. The natives, therefore, depend upon vegetables shipped in from the south and they get relatively few, if any, vegetables in their diet.

DR. L. L. DAVIS: What part do the ultra-violet rays play in the formation of Vitamin D?

MR. NIELSEN: Certain specific ultra-violet rays convert ergosterol into Viosterol or Vitamin D. Ergosterol is present in minute amounts in the oil of the skin, and these ultra-violet rays penetrate through the skin, converting the ergosterol into Vitamin D which is then absorbed into the body. In large communities like Chicago, where the air is filled with smoke and dust, these particular rays rarely if ever reach the dwellings. I doubt whether any Vitamin D benefit is derived from the sun in such communities even in July and August when sunlight in the northern

part of the United States is somewhat more abundant in these rays.

DR. DAVIS: How about the ultra-violet lamp?

MR. NIELSEN: The ultra-violet lamp furnishes these particular activating rays but it is very difficult to standardize the activation to a uniform Vitamin D equivalence.

DR. DAVIS: I was reading the other day that there might be danger in the use of the ultra-violet lamp.

DR. NIELSEN: Over-irradiation is dangerous.

DR. DAVIS: Some investigators found a certain amount of Vitamin D in cancerous tissue, and while the ultra-violet rays may not affect the person it might be the means of handing down to other generations the tendency to cancer.

MR. NIELSEN: That may or may not be so. It is interesting to speculate about these things. I think of cancer as a nutritional disorder and perhaps the future will show that it is. Many diseases which we now call organic will undoubtedly be found to be nutritional disorders; for one thing, I am convinced that nutrition has more to do with dental health than any other thing, including the toothbrush.

I am reminded of the question of Viosterol versus natural Vitamin D. It has been stated that Viosterol causes disturbances in certain people, especially children. These disturbances have occurred not because of the Viosterol but in spite of it. They are usually cases in which calcium and phosphorus are out of proportion to the amount of Viosterol administered. It is essential that calcium and phosphorus be supplied in the amount of not less than one gram of calcium and 1.2 grams of phosphorus per day, but many people do not get these amounts in the diet. Milk is the most dependable source for these two minerals and will furnish the required amounts in one quart per day. Since these minerals and Vitamin D are of prime importance to the condition of the teeth, the dentist should see to it that they are furnished in adequate amounts to his patients.

QUESTION: What statistics do you have on the feeding of Dicalcium Phosphate to humans?

MR. NIELSEN: We have not assembled any statistics as yet.

QUESTION: What statistics on animals?

MR. NIELSEN: We know that Dicalcium Phosphate is an adequate source for Calcium and phosporus in rats.

QUESTION: Can you overfeed them with calcium? What happens?

MR. NIELSEN: Feeding of a large excess of calcium in proportion to phosphorus and in the absence of Vitamin D, or in the presence of too small an amount of Vitamin D, causes rickets in the rat. We have never tried over-feeding with dicalcium phosphate. I do not think there is any opportunity to over feed dicalcium phosphate to the human because if one gram of calsium is supplied per day no more is needed.

QUESTION: What happens if you do get more?

MR. NIELSEN: The reaction from an excess in all probability depends upon the individual.

QUESTION: Is it harmful? That's the question.

MR. NIELSEN: Let me answer by asking you the question, "What would happen to a person if he started to eat ten times as much salt as ordinarily?"

QUESTION: I mean, if you get two grams of calcium a day instead of one in the form of dicalcium phosphate.

MR. NIELSEN: That would not be harmful as far as I know. The body would in all probability absorb the required calcium and phosphorus from it, all provided that there is sufficient Vitamin D to take care of it; the rest would pass on and be converted by the alkaline juices of the intestines into tricalcium phosphate which is insoluble and would finally be excreted.

DR. KESEL: I was interested in the

statement you made, the abstract and its source. I believe you implied in the statement that when the parathyroid calcium mechanism is upset calcium and phosphorus are removed from the bones and teeth. I wonder if the workers substantiated their findings that the calcium and phosphorus were removed from the teeth as well as from the skeleton. If so, that is contrary to Maxwell Carson and his coworkers at Columbia in their work with rats. They placed two groups, one on a normal diet and the other on a rachitic diet. These latter animals were killed and bones and teeth compared with those of the animals on the normal diet. The incisor teeth of the rats are growing, as we know, and it would be hard to assume if these growing teeth were not changed that the adult human tooth could be appreciably altered in calcium and phosphorus.

MR. NIELSEN: I cannot recall my source of information. The experiments you mention did not take the parathyroid into consideration, of course. The point I tried to make clear was that when amounts of calcium and phosphorus insufficient to take care of all the requirements of the body are given, the normal parathyroid continues to work one hundred per cent and some of the calcium needed in the adjustment of the calcium-phosphorus level in the blood is then taken from the bones and teeth.

DR. KESEL: If it could be proved that it is taken also from the teeth it would be quite enlightening.

MR. NIELSEN: You remember the old saying, "a tooth for a baby." It is difficult to conceive of the blood stream taking calcium from the skeleton but leaving the teeth unmolested.

QUESTION: Is it your opinion that the fruit juices have the importance formerly assigned to them, or was that propaganda?

MR. NIELSEN: I think the fruit juices are very important to dental health. The work conducted with orange juice which you probably have in mind was sincere research work, but the investigators were not able to demonstrate and did not claim that the benefit derived from it was due to Vitamin C, although they suspected it. With chemically pure Vitamin C it should be possible to settle that question.

QUESTION: You spoke of peppers? How is Vitamin C obtained from them?

MR. NIELSEN: The juice is extracted, the bulk of the solid material in it is removed through a number of steps and the Vitamin C finally obtained in crude form and subsequently recrystallized. It is a difficult and complicated procedure during which the vitamin must be protected against oxidation—otherwise no yield at all will be obtained.

DR. BATES: Do the canned fruit juices contain Vitamin C?

MR. NIELSEN: Yes. The commercial canned juice is fairly well protected against oxidation, but fresh juices are superior in Vitamin C content.

DR. MCATHUR: Mr. President, I do not want to close this discussion, because there is a lot of valuable information being brought out; but I have to make a train, and before I go I want to assure you and Mr. Nielsen that the Odontographic Society is to be congratulated on the courage of this gentleman in speaking before us tonight, with all these contending things to detract from the thought.* It has been a long while since we have had a speaker who has absolutely understood his subject so well and made it interesting from a dental standpoint to a group of dentists as this gentleman tonight.

*This was a night of the Legion Convention and the noise in the hotel was disconcerting.

• EDITORIAL •

THE BENEFIT OF BIG MEETINGS

Another Chicago Society Midwinter event has passed on to the side of the "has beens," leaving a chance for survey of good accomplished.

To say that the Chicago Dental Society lacks vision, ambition, coupled with intelligent energy is to also say that the sun's cheerful rays are chilling. We are indeed glad that dentistry has this compelling force; that in fact in each State there appears a component in a metropolitan center that puts our profession in the front.

One has but to listen to the confused statements of people who come to our offices, and in no small measure is it shown that even the simple things pertaining to our work are seldom understood; consequently, there is much suspicion as to our honorable intentions.

It is well to know that from these gatherings with their radio broadcastings, people are being made tooth conscious. The avidity with which dentists attend eagerly the lectures and clinics proves conclusively that knowledge is the foremost consideration.

There is no denial that a better understanding of one's work means a superior grade of service, and in consequence entitles one to a larger compensation, a conclusion wholly in harmony with reason. But aside from this, there is a keen sense of satisfaction in the possession of knowledge, because through it we build ourselves, whereby the grosser things become banal.

Probably the most outstanding contribution of this meeting was the assignment of the physician, and his correlation to our work by giving him a place on the program. How far-reaching will be this action, is not hard to surmise.

There is needed a cordiality between our professions, which will result in a better understanding of our interdependence. When that time happily arrives, there will be less snap-judgment and faulty diagnoses, due to lack of interest and knowledge in our field of labor.

The average dentist needs to meet the medical intelligence in studying diseases of the mouth, such as leukemia, tumors of all kinds, benign as well as malignant, stomach disorders in their connection with mouth lesions, neurologies and other pathologies, the knowledge of which makes a dentist a man the medical profession can proudly claim to be a confrere. While this addition to the Chicago program and others as well is not new, it was stressed more than heretofore.

It is a significant thing that dentistry is getting more Research minded, that into all programs is the need for this advanced learning becoming stressed—and what an interesting and essential adventure it is.

Our dental schools give much emphasis to this part of their curriculum, which is another proof of the passing out of the old idea that our work consists of merely mechanical reconstructions.

So all through this fine meeting seemed to run the idea that dentists must be learned men, men, who by these gatherings garner the wheat and know how to discard the chaff. We yield to no one in appreciation for these annual affairs. And when that is said there follows this fact, that if the same type of enthusiasm is given the efforts of the parent society, the Illinois, at the Annual meeting, a willingness to co-operate for the good of our profession, then big meetings will bring about a benefit that will reflect a challenge to disturbing elements and build up the National organization that stands as a lighthouse on the rocky shore.

THE CORBETT CASE

Word has reached us that the first conviction under our new law took place in Jacksonville recently. According to the report, this man Corbett, an ex-service man has been practicing in the above place without a license or being a graduate of a dental college.

His right to practice is based on the assumption of a dental experience in the army during the war and afterwards in a so-called mechanical school of dentistry. He was fined four hundred dollars, and took an appeal.

Other violators are on the list against whom similar action will be taken. The time has come to weed out men who make a travesty of our laws, and let it be known this is no idle jest.

If people are to be treated for their dental ills, by specially trained men and women who under the law must render adequate and intelligent service, then the laws must protect both the licensed dentist and safeguard the public. In no other way can a high standard be maintained, and without such, we seek the lowest levels of service.

Our Practice Act is being tried in the crucible of legal interpretation, and we have no fear for its ultimate constitutionality.

There are in Chicago, as well as elsewhere throughout the state, some flagrant violators whose illegal activities will be curtailed in a comparatively short time. This conviction may serve to remind them that their boats are in rough waters and 'twere better if they trim their sails.

We are glad to attest to the belief that the men who are at the head of our enforcement bureau or committee are alert and working with intelligence to circumvent the breaking down of this law, and we tender our congratulations to them.

This is just another proof of the value of cooperation through organization, and should be patent to the men who sometimes complain and question the value of belonging to the American Dental Association, of which, of course, are the State and component societies very important divisions.

This fact alone should be the shibboleth to bring the outsider in; and may it be the inspiration to set men to work so that our National Body will be augmented to a higher degree in numbers than ever before. Thereby and thereon rests the security of a profession of which none need be ashamed.

AN ADDED SERVICE

With this number, comes an attempt to create a new service, wholly unselfish so far as this JOURNAL is concerned; with wide possibilities if used, and with no expense to the dentist. We even furnish the postage prepaid, and the return card bearing the information sought.

Here is the plan: a dentist somewhere in the State of Illinois desires confidential information on commercial products, equipment for sale, or information concerning the companies or salesman offering the sale; or if there is some doubt as to a certain remedy, its composition, reaction or what-not; in fact, anything pertaining to furthering of his practice we will obtain and send to him unprejudiced opinion using every means to establish the truth.

In these days of exaggerated claims, we speak now as to the so-called virtues of many things handed or sent to us to purchase, there is needed a "know it" man, a middleman of undoubted knowledge who can direct and advise, and that without the slightest desire to hurt honest merchandise.

One of these "know it" men nipped in the bud, a wild dream for wealth upon analyzing a so-called remedy for pyorrhea. It was found to consist of cider vinegar and a few ineffectual drugs incompatible with sense or chemistry, all for the mere sum of *ten dollars* a bottle, and the bottle of most meager dimensions. We mention the bottle because the value, however small, was of the container and not in the contents.

This plan is also applicable in the event that a dentist wants to rearrange his office, or feels that he is not getting the best utilization of the space occupied. If he sends a rough sketch of his present arrangement we will be glad to submit it to a dental supply house for suggestions and return the best information possible.

In other words we hope to be helpful, thereby creating a wider field of service.

THE BUREAU OF PUBLIC RELATIONS

The possibilities attending this bureau of the A. D. A. by contacting the various associations throughout the country is very great. It opens to the understanding of numerous bodies a better conception of what dentistry really means to communities, how it can and does cooperate in matters of health, the dispensing of literature that reveals the deep import of its mission of physical and mental service.

Dentistry aims in its collaboration with the medical profession to a broadening of health information, the possession of which in the homes, is of inestimable value. In these times when much misrepresentation is rampant, the kindly offices of medicine and dentistry offer a boon to the perplexed.

There is no ulterior motive in such activity, for as has been often said, the health of the nation is contained in the individual, and how he measures up to that greatest of blessings of a sound mind is a sound body.

The agencies such as the Parent-Teachers Association, the Tuberculosis hospitals, and other organizations whose contacts with children are very intimate afford fine fields for spreading this doctrine. The more knowledge from a legitimate source, the less acceptance of misstatements from an unquestionable one.

This Journal will gladly aid in every way possible the efforts of this Bureau to send out the light, and by the awakening of the public mind create a desire to a better appreciation of dental health.

News of the Annual State Meeting

Dean Ralph E. Heilman—Speaker, Tuesday evening, May 8th. Subject "Some Aspects of the Current Economic Situation."

Dean Ralph E. Heilman

BIOGRAPHICAL DATA REGARDING RALPH E. HEILMAN, PH.D. (HARVARD), LL.D.

Dean, School of Commerce, Northwestern University.

Formerly member of faculty at Harvard and at University of Illinois. Professor of Economics and Social Science, 1916-1919, Northwestern University; and Dean of the School of Commerce, 1919-date.

Formerly President, American Association of Collegiate Schools of Business; Vice-president, American Economic Association.

Chairman, Ways and Means Committee, Chicago Association of Commerce, 1929 and 1930.

Member Trade Relations Committee, Chamber of Commerce of the U. S. A. Formerly District Representative, Emergency Fleet Corporation, and examiner Shipbuilding Labor Adjustment Board, Northern Atlantic District, 1918-1919.

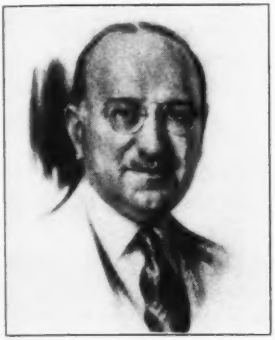
Has served as chairman for various boards of arbitration under the United States Board of Mediation.

Contributor on economic subjects to many business periodicals and publications.

Governor Horner will speak at our banquet Wednesday evening, May 9th.

BIOGRAPHY OF GOVERNOR HORNER

Governor Henry Horner, member of a pioneer Illinois family, was born in Chicago fifty-four years ago. Receiving his preliminary education in the public schools of Chicago, and the Chicago Manual Training School, and the South Side Academy, he then attended the Kent College of Law, being admitted to the Bar in 1899. He has received the degree of Doctor of Laws from Knox College, Galesburg, and also from the Lincoln Memorial University of Tennessee.



Governor Henry Horner

He began the practice of law in 1899 with another young attorney, Frank A. Whitney, whose father, Henry C. Whitney, was a law partner of Abraham Lincoln, and subsequently one of his best biographers. It was through this association that Governor Horner became an ardent admirer of the rail splitter, an admiration that has inspired him to gather one of the great private collections of Lincolniana.

Early becoming interested in civic affairs, Henry Horner soon became recognized as an authority on the problems of social and civic welfare. This brought him into public life. In 1911 he was a member of the Chicago Charter Convention.

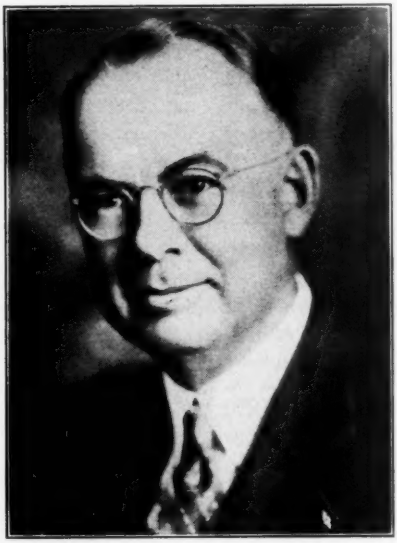
In 1914, he was nominated by the Democratic Party of Cook county for Probate Judge and elected. Then, for five successive terms of four years each, he was re-nominated and re-elected, each time with a larger majority than before. He was serving his eighteenth year as Judge of the Probate Court of Cook county, when he resigned the bench to become Governor of Illinois, having been elected chief executive of Illinois in November, 1932.

During his long tenure of office in the Probate Court, Judge Horner introduced many changes in procedure that have been widely followed in other states including th "Horner Plan" for handling the estates of war veterans without legal costs, expenses or attorney's fees to the beneficiaries.

Governor Horner, prior to his election to the Governorship, was called upon many times to serve as the neutral arbitrator in labor disputes. He also served on many boards and commissions dealing with social and public welfare problems.

Governor Horner's contribution to dentistry lies in the fact of putting his signature to the Dental Practice Act last July whereby our professional standards were raised and the interests of the public were safe-guarded.

BIOGRAPHICAL DATA REGARDING DR. ARTHUR C. WHERRY, PRESIDENT, AMERICAN DENTAL ASSOCIATION, SALT LAKE CITY, UTAH



Arthur C. Wherry
President A. D. A.

In going back over the record of Dr. Wherry's achievement, we find that he has always been a leader, and his dental record shows that he has been given the Presidency of every society in which he has held membership including the Utah State Board of Dental Economics.

He is a very forceful talker and will be one of the principal speakers at the Banquet Wednesday evening, May 9th. Subject: "The American Dental Association."

Arthur Cornelius Wherry, D.D.S.

Graduate of Chicago College of Dental Surgery in 1902.

Member of Salt Lake County, Utah State and American Dental Association. Ex-president Utah State Dental Society. Ex-president also Secretary Utah State Board of Dental Examiners.

Ex-president Salt Lake Co. Dental Society.

Specializing in Oral Surgery.

SPRINGFIELD HOTELS AND RATES

Abraham Lincoln Hotel—Headquarters—Fifth Street and Capitol Avenue.
300 rooms, with bath, capacity 500 people.
Single: $3.00, $3.50 and $4.00 per day.
Double: $4.50, $5.00, $6.00 and $7.00 per day.

Elks Club (Hotel) —509 South Sixth Street.
30 rooms, with bath; 72 with lavatories, hot and cold water.
Single: Without bath, $1.50; with connecting bath, $1.75; with private bath, $2.00.
Double: Without bath, $2.50; with bath, $3.50.

Empire Hotel—422 East Jefferson Street.
175 rooms.
Without bath, $1.00 to $1.50; with bath, $2.00 to $2.50.

Illinois Hotel—Fourth and Washington Streets.
100 rooms.
Single: Without bath, $1.00, $1.25 and $1.50.; with bath, $2.00 and $2.50.
Double: Without bath, $2.00, $2.50 and $3.00; with bath, $3.50 and $4.00.

Leland Hotel—Sixth Street and Capitol Avenue.
250 rooms, capacity 450 people.
Single: Without bath, $1.50 to $2.25; with bath, $3.00, $3.50 and $3.75.
Double with bath, $4.00, $4.50, $5.00, $5.50 $6.00 and $7.00.

St. Nicholas Hotel—400 East Jefferson Street.
350 rooms—450 beds (200 with private bath).
Single: Without bath, $2.00 and $2.25; with bath, $2.50, $3.00, $3.50 and $4.00.
Double: Without bath, $4.00 and $4.50; with bath, $4.00, $4.50, $5.00 and $6.00.

Also *Silas, Argus, Windsor, Sangamon, Huskey, Daniels,* and many smaller hotels with 40 to 75 rooms each.

SPRINGFIELD GARAGES

Acme Garage—414 South Sixth Street.

Romie Fields—317-319 South Third Street.

Glisson Motor Company—Fourth and Jackson Streets.

Motor Inn—309 South Fourth Street.

New Auto Inn—421 South Fourth Street.

Uptown Garage—319 East Jefferson Street.

PERSONNEL OF LOCAL COMMITTEES

70th Annual Meeting, May 8, 9, 10, 1934, Springfield, Illinois

Local Arrangements Committee—Ogden B. Munroe, Chairman, 612 Public Service Bldg., Springfield; B. B. Beatty, J. J. Donelan, H. D. Fullenwider, C. O. Whitten.

Local Program and Clinic Arrangements Committee—H. P. Robinson, Chairman, Myers Bldg., Springfield; J. W. Green, E. B. Ratliff, J. J. Forestner, Jr., D. E. Doolen, Lincoln.

Scientific Exhibits Committee—J. L. Lambert, Chairman, Ridgely-Farmers Bank Bldg., Springfield; H. S. Layman, L. J. Dennison, J. L. Dixon, Clinton, A. E. Seymour, Virden.

Ladies' Entertainment Committee—H. B. Singler, Chairman, Myers Bldg., Springfield; J. C. Donelan, L. L. Hopkins, J. T. Yates, H. P. Robinson.

Golf Committee—W. E. Wilson, Chairman, Myers Bldg., Springfield—L. R. Stearman, O. H. Seifert, A. Gerster, W. N. Johnson.

Hotel Reservations Committee—R. T. Curren, Chairman, Myers Bldg., Springfield; E. C. Jordan, J. R. Jones.

Banquet Committee— C. W. Holz, Chairman, 709 Ridgely-Farmers Bank Bldg., Springfield; H. L. Hester, H. T. McDermott, L. W. Neber, G. W. Mills.

Publicity Committee—A. E. Converse, Chairman, Ridgely-Farmers Bank Bldg., Springfield; T. P. Donelan, G. J. Krotzsch, G. B. Weakley, R. P. Booth.

Trap Shoot Committee—E. F. Hazell, Chairman, 608 E. Capitol Ave., Springfield; R. R. Blanchard, Guy H. Traylor, C. G. Maxwell, G. C. Carruthers.

Information Committee—O. L. Frazee, Chairman, 1233 South 4th St., Springfield; C. D. McDougall, Petersburg, E. P. Lawrence, J. B. Watts, L. E. Wood.

Reception Committee—F. A. Stewart, Chairman, Girard; G. W. Mills, L. V. Halbert, G. H. O'Hara, H. T. McDermott, A. Lambert, J. J. Forestner, Sr., C. G. Carruthers, Edward Wall, J. R. Leib, E. R. Goebel, G. S. Van Wormer, H. M. Hill, Auburn, S. G. Hoblit, Lincoln, Roger House, Auburn, G. W. Spears, Petersburg.

SPECIAL RATES FOR SPRINGFIELD MEETING

The Transportation Committee announces that members residing in the territory governed by the *Central Passenger Association* will be given special return rates from the Annual Meeting at Springfield, on the Certificate Plan. The usual plan will be used. *100 certificates* being required to secure the special return rate.

When purchasing tickets members are requested to be sure to ask for a certificate at the time of the purchase of the going ticket. Immediately upon arrival at the meeting, these certificates must be deposited at the Registration Booth, Abraham Lincoln Hotel, Springfield, in order that they may be validated to secure the return rate.

The *Western Lines* have reduced their passenger fare and round-trip tickets will be sold on the basis of *one and one-third of the first class fare.* That basis is lower than heretofore authorized for convention travel and may be taken advantage of by members residing in the territory governed by the Western Passenger Association.

Your local ticket agent will advise you as to which territory you belong.

TRANSPORTATION COMMITTEE
H. V. Blayney, Chicago.
J. W. Ferguson, Marion.
R. H. Johnson, Chicago, Chairman.

SPRINGFIELD WELCOMES YOU MAY 8-9-10

The entire membership of the Sangamon-Menard-Logan County Dental Society is hard at work to make the 70th Annual Meeting of the Illinois State Dental Society a success.

Local committees are working in conjunction with the Program and Clinic Committees to provide every convenience and accommodation desired.

Ladies' Entertainment, Golf, Trap Shoot and Banquet Committees are all perfecting their plans for your recreation and amusement.

The Scientific Exhibit Committee also has plans for a large educational display.

The numerous features of the three-day program are assurance that the meeting will be an unusually successful one.

A most cordial welcome awaits you in *Springfield, May* 8-9-10.

OGDEN B. MUNROE, Chairman,
Committee on Local Arrangements.

AMERICAN DENTAL ASSOCIATION

HOTEL RESERVATION

St. Paul, Minn. August 6-10, 1934.

In securing hotel reservations for the 1934 Session, consult the hotel rate-sheet and fill out the blank application on page 122. Mail immediately to the hotel you wish to patronize. The hotel will then advise you of the reservation which they made for you.

In case your first choice cannot be made kindly indicate second and third choices. If none of your choices are available the Hotel Manager will mail your application to the Chairman of Halls and Hotels Committee and he will place your reservation in as favorable a hotel as possible.

Please remember that a reservation constitutes a contract with the hotel to provide you with the accommodations you desire. If you find it impossible to carry out your part of the contract, namely, to occupy the room at the time agreed upon, please write or wire the hotel, releasing it in order that your room may be available for other members.

HOTEL	With Bath One Person	With Bath Two Persons	Without Bath One Person	Without Bath Two Persons
Angus, 165 Western Ave.....	$2.50-3.00	$ 3.50	$1.50	$2.50
	3.50	4.00	2.00	3.00
Astoria, 374 Wabasha St.....	2.00-2.50	3.00-3.50	1.00	1.50
		4.00-4.50		
Commodore, 79 Western Ave...	2.50-3.00	4.00TB-4.50TB		
	3.50-4.00	5.00TB-5.50TB		
	4.50-5.00	6.00TB		
Euclid, 405 N. Washington St..	2.00-3.00	3.00-4.00-4.50	1.25	2.00
Frederic, 45 East 5th St.....	2.00-2.50	3.00-3.50-4.00	1.25-1.50	2.00-2.50
Hotel Jewell, 17 East 5th St....	2.00-2.50	3.50-400	1.00-1.50	1.50-2.00-2.25
Hotel St. Francis, 7th & Wabasha	2.50-3.00	4.00-4.50-		
	3.50	5.00TB		
		5.50TB-6.00TB		
Hotel St. Paul, 363 St. Peter St.	2.50S-3.00	4.00S-5.00		
	3.50	6.00TB-7.00TB		
	4.00T&S	8.00TB-9.00TB		
	4.50T&S	12.00 Suites		
	5.00T&S	15.00 Suites		
Lowry Hotel, 339 Wabasha St..	2.50S	3.50-4.00		
	3.00S	4.50-5.00		
	3.50-4.00	6.00TB-6.50TB		
	4.50T&S	7.00TB-7.50TB		
	5.00T&S	15.00 Suites		
	12.00 Suites			
Marlborough, 148 Summit Ave..	2.00-2.50	3.00-3.50		
Palmer, 321½ St. Peter St.....			1.00	1.50
Ryan Hotel, 402 Robert St.....	2.00-2.50	3.00-4.00TB		
	3.00-4.00	5.00TB-6.00TB		
St. Paul Athletic Club, 340 Cedar St. (Men only).....	3.50			

S—Shower; T&S—Tub and Shower; TB—Twin Beds.

MAIL THIS APPLICATION DIRECT TO THE HOTEL

HOTEL RESERVATION

AMERICAN DENTAL ASSOCIATION, St. Paul, Minn. August 6-10, 1934.

.....Hotel.

St. Paul, Minn.

Please reserve sleeping room accommodations as noted below:

.....Room(s) with bath for..... people. Rate desired per day $.....

.....Room(s) without bath for..... people. Rate desired per day $.....

Second choice hotel..... Third choice hotel.....

ROOMS TO BE OCCUPIED BY:	ADDRESS IN FULL
Applicant	.....
.....	.....
.....	.....
.....	.....

Please confirm this reservation to applicant. I further agree to notify the hotel at once in the event I am unable to use this reservation.

IMPORTANT TO HOTEL MANAGER.—In the event you cannot accept this reservation, please forward this application at once to DR. E. J. SIMON, CHAIRMAN HALLS AND HOTELS COMMITTEE, 364 Lowry Medical Arts Bldg., St. Paul, Minn., who will attend to the assignment of this reservation.

Plan Your Vacation With Our Vacation Committee

DON'T

Plan your VACATION until you have our suggestions. Attend your AMERICAN DENTAL ASSOCIATION CONVENTION, AUGUST 6-10, 1934, at SAINT PAUL, MINNESOTA.

Vacation among Minnesota's 10,000 lakes. You'll never forget it. Write to the Vacations Committee, indicating on the form below your choice of vacation and the Committee will forward their suggestions to you.

Places they KNOW will meet with your approval.

Cut out and mail to Dr. O. J. Merwin, Chairman. Vacations Committee, 478 S. Snelling Ave., St. Paul, Minnesota.

☐ Tours—with stop-overs at good lodges and resort hotels for 3-4-5 and 6 days.	☐ Camping sites—Fishing accommodations.
☐ DeLuxe resorts—lodges, golf accommodations, etc.	☐ Canoe trips—Guide—Food—Canoe—Camps included.
☐ Cabins—with central dining halls.	☐ Boat trips.
☐ Housekeeping cabins.	☐ N. B. Ask for any other accommodations not included above.

THE FORUM

THIS FORUM is conducted for you with material sent in by you. WHAT do you want it to contain? WHAT questions would you like answered here? Send them in now. The editor will get some known authority to answer them. If it is a debatable question he will throw it open to the entire membership for discussion. WE need HELP from YOU to keep these pages filled with interesting material. This is YOUR JOURNAL and YOUR FORUM.

Send all material to Dr. Harold W. Oppice, 1002 Wilson Avenue, Chicago, Illinois.

STAINLESS STEEL AND CHROME ALLOY FOR ORTHODONTIA BANDS

The question, submitted to the Forum, "Have the new materials such as 'Stainless Steel' and 'Chrome Alloy' proven successful for orthodontia bands?" is on a very limited phase of the true usefulness of these alloys. I will try to answer it definitely and then add other places where these alloys have been used successfully.

Stainless Steel for orthodontia bands has had a larger percentage of failures in the hands of various investigators than it has had successes. By failure I mean that the joints, although they appear perfectly soldered to the naked eye, open up after a time. In other words, we do not get a true soldered joint.

Two investigators have developed technics whereby the joints once soldered, stay soldered. Dr. Brooks Bell of Dallas, Texas, punches holes in the lapped portion of the band with a Jewelers Main-spring punch and in addition to soldering the lapped portion, fills the holes with solder. Dr. Brusse of Denver, Colorado, spot welds all joints with an electric welding machine before soldering. With either of these technics I believe orthodontia bands of Stainless Steel can be used successfully.

For the past ten months I have used a "Chrome Alloy" for all phases of orthodontic appliance construction without having any of the soldered joints become unsoldered. The technic for properly soldering these metals is somewhat different than precious metals. One of the large Chicago Laboratories has made thousands of clasps and bent wire partials during the past eight months. These "Chrome Alloy Partial Dentures" have done such fine service that the manager of this Laboratory tells me that of this date only 20 per cent of the cases in his laboratory are of precious metal. I, personally, have used this metal for shell crowns on low income patients. Also, stainless wires make ideal post material, especially in building up angles with synthetic porcelain.

Respectfully,
(Signed) JAMES J. GUERRERO.

CHICAGO DENTAL SOCIETY AND EMERGENCY DENTAL RELIEF

In the January issue of this JOURNAL "The Forum" criticized the Chicago Dental Society for asking its members to continue to render dental service to indigents at a negligible fee since the State and Federal Emergency Relief Commissions were paying for this service from Public Funds.

Dr. M. D. K. Bremner, Chairman of the Emergency Relief Division of the Chicago Dental Society was known to oppose radical advancement of the fee scale for this service and he therefore was asked if he would like to explain his position in these columns.

Below is a copy of letter and statement

received from Dr. Bremner explaining his position together with a schedule of the fees (submitted by Dr. Bremner) *still* received by dentists in the Chicago Area for services rendered to indigents.

My dear Oppice:

It may interest your readers to know that after considerable discussion, the several committees of the Chicago Dental Society have decided to ask for an increase in fees for emergency dental relief service. The increase asked for is about 200 per cent.

Whether the state will agree to increase the monthly expenditure or decide to decrease the quantity of dental service, is hard to tell. Personally, I disagree with the majority of the committee. It is my opinion that fees should be raised 100 per cent for the present. The enclosed statement which I read before the committee will give some idea of my views and the reason for the position that I have taken.

Sincerely yours,

(Signed) M. D. K. BREMNER.

STATEMENT

In order that my attitude regarding the raising of fees may be understood and not misinterpreted, I am going to make the following statement which I request should be placed as part of the minutes of this Committee.

I am in favor of obtaining from the State or any other source just as large an allotment of money for dental service as possible. I am in favor of a 100 per cent increased remuneration to the dentist, or twice the amount we are now paying—not that I think this is adequate, but for the following reasons:

(1) As a matter of policy, we will probably have less difficulty in getting a smaller increase now for the present fiscal year ending next September, and, if conditions seem favorable, raise it again for the fiscal year 1934-5 commencing on October 1st.

(2) I believe that a higher fee will not put any more money into the dentists' pockets, but will tend to decrease the amount of dental service now rendered.

(3) I believe that it will be detrimental to the dental profession to take any position which will tend to decrease rather than increase dental service to the indigent.

(4) It is my opinion that in all probability, the sum total of money that will be spent by the community or state for dental service will be greater if the fees are lower rather than higher. In other words, in actual dollars and cents the dentist doing this work will receive more money at the lower fee than at the higher fee.

(5) In supporting a lower rather than a higher fee, I am merely asking the dentist to give a little more of his time for the available money. I am just as anxious as anybody to see that the dentist earns as much money as possible. The difference between my position and the position of those who insist on a higher fee is not in dollars and cents but rather in the amount of dental service rendered for a given sum of money.

(6) It is my opinion that since the average dentist has so much vacant time on his hands which is absolutely wasted, that it would be to his economic advantage if he served three patients instead of two for the same amount of money, because, when conditions improve, he will have become acquainted with one-third more people, and that is bound to help his practice. We must bear in mind, of course, that these people are not paupers and that some day they are going to get jobs and will then be able to pay reasonable fees for dentistry.

Respectfully submitted,

M. D. K. BREMNER, Chairman.

FEES

Fees are about 20 per cent of the minimum fees charged by the average dentist in the poorer neighborhoods. For example, a simple occlusal amalgam—60 cents; two surface amalgams—80 cents; three surface amalgams—$1.00; synthetic porcelain—75 cents; full upper and lower dentures—$15.50; the dentist receives nine dollars for taking the impression and fitting the

dentures. The laboratory gets $6.50 for its services. (These fees are about to be raised 100 per cent.) Partial dentures the same as full dentures plus the cost of clasps; no bars. The average cost per single denture including clasps for partials is approximately $8.50. The average cost for all general service including extraction is about $2.50 per patient. Extraction charges—$1.25 per patient regardless of the number of teeth to be extracted or the number of visits required.

The average number of extraction patients per month is 1,400. This costs the State Emergency Relief Commission about $1,750 per month. This sum is used to pay the Central Office overhead, including extraction room, the examining room and clerical service. All other services are charged to the State Emergency Relief on the basis of the fees mentioned above.

Central Office—Personnel, Salaries, Equipment and Costs

The personnel in the central office consists of one director—no salary; four examining dentists—each work two or three half-days per week—salary, $1.12½ per hour; eighteen extracting dentists, salary 90 cents per hour. A few volunteers who spend from one to three hours per week, two nurses, one bookkeeper, three girls in the assigning room, one stenographer. The office is open daily from nine to five, Saturday until one.

The central office equipment consists of one examination chair and accessories; three extraction chairs and accessories; office desks, files, typewriters, etc. Rent is $50.00 per month. The building management donates the other 50 per cent of the rent. Telephone and lights.

Source and Amount of Finances

Funds to supply this service are supplied by the Illinois Emergency Relief Commission, who, in turn, receive their money from taxes and from federal relief. For the year (1934) $7,000.00 per month or $84,000.00 was allocated by the State Emergency Relief Commission to the Chicago Dental Society Emergency Dental Relief Commission for this work.

EXECUTIVE COUNCIL REPORT

On February 26, at the Stevens Hotel, the Executive Council of the Illinois State Dental Society met to discuss problems and to hear reports from the standing committees.

Dr. Ben H. Sherrard our Secretary, gave an interesting and comparative report. It is true there has been some loss of members because of unavoidable circumstances, but the State Officers have made allowances to the extent that many delinquent members have taken advantage of the offer and are now in good standing in our State Society.

Each component and individual should make a strong effort to obtain new members, or get deliquents reinstated.

The attendance at component and district meetings is gratifying and encouraging. There is a distinct interest in dental problems throughout the state. Each man is trying hard to become more proficient and alert in obtaining knowledge which will improve his ability so that he may serve his patients to better advantage.

The question of the enforcement of our new Dental Practice Act is causing some discussion. To date there have been two favorable decisions given our law in the courts of Illinois.

It was thought those opposing our law would appeal it to the Supreme Court, but apparently there is no intention to do so. It will be necessary for our state organization in conjunction with components to take steps which will bring violators before the courts. Such a procedure is now in progress and we hope to have a favorable decision from the higher court in the state

before long. In legislative matters both time and expense should be conserved especially when it will be to the advantage of our organization and its members.

Dr. P. Idler our Treasurer, gave a very satisfying report as to the financial standing of our state society. He is to be congratulated upon his efficient manner in handling our funds.

Dr. L. W. Strong, Chairman of the Program Committee has arranged one of the best programs that has been offered to any dental organization. Dr. Strong's preliminary report informed us that the program is complete and made up of some of the best talent obtainable. Each subject will be treated by outstanding men.

Dr. N. D. Vedder, Chairman of the Table Clinics gave a very interesting report and assured the council that all the departments of dentistry would be represented.

Dr. Harold Hillenbrand representing lecture clinics has obtained the services of four men who will spend one-half day each in lecture demonstrations.

From our General Arrangements Committee headed by Dr. Ogden Munroe and his efficient associates comes the report that Springfield is prepared as always to see every one is taken care of and made happy.

Our Publication Committee made up of Drs. B. H. Sherrard, F. B. Clemmer, R. G. Kesel and B. O. Sippy is deserving considerable credit for the manner in which our Illinois Dental Journal is handled. Reports from these men show clearly what has and is being accomplished through our official publication. Many questions asked by the membership in relationship to problems are answered in the columns of the Journal.

Committee on Mouth Hygiene and Public Instruction was reported by chairmen Drs. F. A. Neuhoff and W. Whalen. It is gratifying to hear how splendid our state is organized under this efficient committee. The amount of work ahead shows clearly the foresight of this committee, and the cooperation received from the State Health Department under the leadership of Dr. F. Deatherage.

Dr. Harold Oppice, chairman of the Public Welfare Committee, explained and discussed the proposed plan to care for the dental needs of the indigent. The council discussed this plan thoroughly from every angle and authority was given the committee to continue their negotiations with the Emergency Relief Commission.

The plan now is practically completed and is awaiting the sanction of the Relief Commission. This plan will provide dental care for the indigent at a minimum fee for the dentist.

Each county in the state where there are people on the general relief roll will be entitled to dental service providing the dentists in the county have agreed to the plan.

There is no desire on the part of the Relief Commission to alter or change the long established relation between patient and dentist.

Other standing committees sent in written reports regarding their activities, and are encouraged and stand ready and willing to work whenever duty calls.

The entire council took part in the discussions of problems and business pre-

sented, thereby disposing of all business in the one day.

Reserve May 8-9-10 for Springfield.

W. I. McNeil, President.

STUDY CLUB COMMITTEE

Several members of the State Study Club Roster have been invited into a number of the various component districts of the State since our last report. These men have willingly responded and have given generously of their time and talent. The dentists, in every district where these meetings have been held, have expressed their appreciation for the splendid services of these instructors. It has given your Committee a lot of pleasure to work with the fine group whom we have as instructors and for the chairman of the various districts. We have had complete loyalty and co-operation in our contacts with both of the above groups. Your Committee takes this opportunity to thank all of those who have made these study club programs possible and we want the various component societies, who have not taken advantage of the opportunities that were offered them earlier in the year, to know that we still have a number of instructors available and we will be very happy to arrange a meeting for you with them. These meetings, with their instructors, are as follows:

January 25, Dr. Warren Willman spoke before the Study Club group of the Eastern Illinois Dental Society in Mattoon with fourteen in attendance. Subject—Pyorrhea. Among the phases of this subject discussed were: (a) Marginal Pyorrhea, (b) Epithelial Attachment, (c) Enamel and Cementum, (d) Diffuse Atrophy, (e) Difficulty of Diagnosis. This meeting according to Dr. W. B. Tym of Charleston, chairman for the Eastern Illinois District, proved to be very instructive and was enjoyed by the entire membership.

February 1, Dr. R. E. McBoyle of Chicago was instructor for the St. Clair District, which met at Hotel Belleville in Belleville, Illinois. He spoke on Crown and Bridge Work—with special reference to use of vital abutements with his lecture, table clinic, and lantern slides. During the evening session he reviewed the high spots of the afternoon and gave more information in detail. Dr. R. C. Kolb of Mascoutah, reports that all present enjoyed the meeting, learned much, and extend their appreciation to Dr. McBoyle and the Study Club Committee.

February 5, the Peoria District Dental Society had Dr. Rudolf Kronfeld as their clinician. Subject for afternoon session: "A Report and Demonstration of the Development of the Human Teeth Between Birth and Adolescence." Subject for evening session: "Progress in Clinical and Microscopic Dental Pathology," illustrated by lantern slides. Unusual interest was shown by the large attendance of forty.

February 5, "Diet and Blood Chemistry" was the subject discussed by Dr. John L. Kendall of Chicago, before the McLean County Dental Society of the Illinois Hotel, Bloomington. Dr. Kendall is Professor of Physiological Chemistry at the Chicago College of Dental Surgery and head of the Blood Chemistry Department of the Cook County Hospital. The members were very well pleased with Dr. Kendall's talk and they hope to have him with them next year.

February 12, Dr. P. G. Puterbaugh, of the Oral Surgery Department of Loyola University, gave a most interesting lecture on "Local Anesthesia, and the Preparation of the Mouth for Artificial Dentures." This was illustrated with motion pictures. The lecture was preceded by a motion picture of a canoe trip through the Tamagami National Park, covering over one hundred miles without a guide. There were a number of visitors from surrounding districts, giving a surprisingly large attendance. This was the winter meeting of the Whiteside-Lee County Dental Society which was held in Dixon, Illinois. During the session Dr. Z. W. Moss gave a brief resume of the nation-wide program for school clinics. Their next meeting will be held in April at Dixon, in honor of Dr. G. B. Dillon of Sterling, who will have completed fifty years of active practice.

Feb. 14, "Children's Dentistry" was the

subject given before the Eastern Illinois District by Dr. Colvin Stine in Mattoon with fifteen in attendance. He discussed materials used in filling cavities in deciduous teeth, management of child, different temperaments, etc.

EASTERN ILLINOIS DISCUSSION GROUP

This group this past month has been studying Diseases of the Periodontal Tissues, following the text-book of Dr. Rudolf Kronfeld. Judging by the excellent "recitations" of the members, the subject has been interesting. It is interesting also to report that some of the members have made and brought in some unusual ground sections demonstrating odd secondary dentin formations, caries of the enamel and dentin, etc. One member reports "twenty minutes from extraction of the tooth to a microscopic examination under oil immersion lens." Dr. M. K. Hine, the instructor of this group says, "What a record."

HOMER PEER,
Chairman of Committee.

THE BUREAU OF PUBLIC RELATIONS

American Dental Association

Recently developed material, so new that it has not as yet been included in our regular educational lists.

"The Care of the Teeth" *Booklet*. 32 pages of authoritative dental health information; written in lay language. Richly illustrated with 80 photographs of actual cases. Approved by the American Dental Association and the United States Public Health Service. The type of material dentists want to give their patients. Educators and public health workers can use it as teaching material in schools. Single copies 10c; 12 copies $1.00; 50 copies $4.00; 100 copies $7.50; 500 copies $25.00; 1,000 copies $45.00. (See Journal of the A. D. A., December, '33.)

Practical Tooth Brushing Chart. Printed in two colors (size 22x28 in.). It demonstrates a practical toothbrushing method for children and adults. This good looking chart supplies a long felt want for schools, dispensaries nad private offices. Price 50c. (See Journal of the A. D. A., February, '33.)

First Grade Educational Leaflets. Six leaflets designed for first grade work. Each lesson printed on 8x11-inch drawing paper. The wording is adapted to first grade vocabulary. The simple artistic drawings are to be colored by the children. This material will enable educators to coordinate the teaching of dental health with that of art and reading. Single set of six leaflets 5c; 25 sets 50c. (See Journal of A. D. A., March, '34.)

Newspaper Articles. Written as a semi-continued story—"John, Mary and Jack," in 52 installments. Each installment contains a dental health lesson. Approved by the American Dental Association and the United States Public Health Service. Distributed free to component societies for insertion in local newspapers. (See Journal of A. D. A., April, '34.)

New Motion Picture "Nature-Builder of Teeth"—16 mm. shows the development of teeth from birth to adulthood. Explains the part played in facial development by the erupting forces of teeth, also effect of nutritional disturbances and illness on tooth development—mottled teeth, normal and abnormal occlusion, are portrayed. Written lecture accompanies film. Price $25.00. Rental fee $1.00 per showing plus express charges.

IF GOLF MAKES YOU RAGE DON'T PLAY IT!

Dr. Morris Fishbein, editor of the Journal of the American Medical Association, believes golf is a better game than football, but that golfers who rage at lost strokes have no business in the sport.

"There is chance in everything," he said. "I once knew a pathologist who laid down and cried when he missed a putt. He had no business playing."

Dr. Fishbein said there are instances in which football has shortened the players' lives.

"But golf," he explained, "is as harmless as any athletics for a man over 40. I have known but two men to die on a golf course. One was struck by lightning. The other fell dead when he made a hole in one."—*Selected.*

INFORMATION SERVICE

Would you like information about:

1. A dental disorder—its cause, treatment, etc.?
2. A dental product, its claims, action, etc.?

or

3. Dental equipment, where manufactured, obtained, etc.?

or

4. What not?

The attached postcard has been prepared for your convenience; return postage is not required. State your problem and we shall do our best to get the answer.

THE ILLINOIS DENTAL JOURNAL
1838 W. Harrison St., Chicago

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 13907, SEC. 510 P. L. & R. CHICAGO, ILL.

THE ILLINOIS DENTAL JOURNAL

1838 W. Harrison Street

I should like the following information:

_____

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Dr._____

_____

Society News and Announcements

THE SPRINGFIELD MEETING

The Illinois State Dental Society will hold its 70th Annual Meeting in Springfield, Illinois, May 8, 9, 10.

The entire meeting will be held in the Abraham Lincoln Hotel and the Local Arrangements Committee are doing everything possible for the convenience and pleasure of those in attendance.

THE CENTRAL ILLINOIS DENTAL SOCIETY

The Twenty-ninth Annual Meeting of the Central Illinois Dental Society met at the Hillsboro Country Club February 15, 1934, with the Society President, Dr. E. B. Strange, of Hillsboro, in the chair.

Nearly fifty members and guests of the Society gathered for the morning session and the afternoon session attendance was much larger. At night a banquet was served at which time Dr. W. I. McNeil of Chicago, President of the Illinois State Dental Society was the principal speaker.

The following program was given: Dr. E. B. Owens of St. Louis gave a paper on Pink Dentures and a Clinic on Luxene. Dr. W. E. Wilson of Springfield, Illinois, gave a lecture on Dental Economics. A lantern lecture on Oral Survery by Dr. A. E. Engle of St. Louis. Dr. Charles F. Deatherage, from the Illinois Department of Public Health, gave a talk on the Dental Survey of Illinois. Dr. Milton Levey of Springfield gave Clinic on Full and Partial Denture Impressions, following which several table clinics were given. Business session was conducted at which time Vandalia was selected as the 1935 next meeting place.

FOURTH ANNUAL REUNION ST. LOUIS UNIVERSITY DENTAL ALUMNI ASSOCIATION

A cordial invitation is extended to all ethical members of the dental profession to attend a Reunion of the Alumni of the St. Louis University School of Dentistry, to be held at the dental school, 3556 Caroline St. (Grand and Caroline Sts.), St. Louis, Mo., on Wednesday and Thursday, April 4 and 5, 1934.

A program of lectures and clinics by representative men will be given, featuring a clinic by the Senior Class of the School. It is planned to make this Reunion the most UNIQUE of those given by the Association.

Come and meet Dr. T. E. Purcell, the new Dean and learn of his plans for the school.

W. C. Gross,
Chrmn. Pub. Comm.

CHICAGO COLLEGE OF DENTAL SURGERY

The Fifty-first Annual Meeting of the Alumni Association of the Chicago College of Dental Surgery, Dental Department of Loyola University, will be held April 9 and 10, 1934, at the Dental School Building, 1757 West Harrison Street, Chicago.

A diversified program of lectures and clinics covering many phases of dentistry and including such men as Drs. George Winter, T. A. Hardgrove, W. H. G. Logan, Rudolph Kronfeld, Clarke Chamberlain, John LaDue, Warren Willman, and Harold Oppice.

The banquet on Monday night, April 9, at the Blackstone Hotel, will honor Dr. John R. (Daddy) Watt, a teacher in the school for the past thirty-eight years.

A. D. A. INSURANCE

Membership in your dental society permits eligibility to the A. D. A. Group Insurance Plan.

Can you offard to be without either?

A $3,000 policy is issued for each age class, as follows:

Age	Annual Cost	Semi-Annual Cost
21 to 30 inc...	$18.50	$ 9.50
31 to 40 inc...	24.50	12.50
41 to 50 inc...	32.00	16.25
51 or over....	49.50	24.95

Should you be interested, write for information to:

Dr. Fred A. Richmond
Insurance Secretary, A. D. A.
Federal Reserve Life Building
Kansas City, Kansas.

WABASH RIVER SECTION DENTAL SOCIETY

Carmi, Illinois, April 19.

This meeting is posted in advance in order that all ethical dentists in this section can attend and enjoy the following program:

10:00 A. M.—Lecture. Preventive Dentistry and Economics—Dr. M. M. Lumbattis, Mt. Vernon, Ill.

10:45 A. M.—Lecture and Clinic. Surgical Treatment of Pyorrhea—Dr. Ralph Bunkhart, Marion, Illinois.

1:30 P. M.—Lecture and Clinic. Dentures, showing impression taking, building of bite rims and securing the bite—Dr. George H. Henderson, Chicago, Ill.

7:30 P. M.—Movie. Showing the Cook-Waite Film on the latest Novocain Anaesthesia.

D. Z. WYLDE, Sec'y.

KIND WORDS

"Why did you throw the pot of geraniums at the plaintiff?"

"Because of an advertisement, your honor."

"What advertisement?"

"'Say it with flowers.'"—*Der Lustige Sachse.*

Home of Abraham Lincoln, Springfield

BONANZA DAYS RETURN TO GOLD MINES

The Klondyke Valley, Yukon River, Cripple Creek and Cariboo County are names among many others, that once were blazoned across the nation and that fired the imagination of even the least adventurous. Today, these names of famous gold strikes are recalled from the past, as the gold mines of the world stir with renewed activity.

Gold deposits that long ago came to return little or no profit to operators, are being worked feverishly as the United States Mint price for the precious metal is raised nearly 60 per cent. The silver producing localities likewise find new life in a price increase of more than 100 per cent. The all-silver mines, Creede and Aspen, long idle, are working at top speed. The Comstock Lode in Nevada, and Virginia City, Montana, are rapidly recovering from a slump of long duration.

Not only are the great commercial mines active, but the ranks of the prospectors too, are swelling with the influx of new and enthusiastic searchers for the metal of wealth. Men, and even women of all classes, with the meagre equipment of the gold seeker, journey to rivers and streams to try their luck at "panning." Of course, there is no mad stampede such as accompanied the California rush of '49, or the Yukon of '96, but it remains for a similar discovery to determine just how much of the romance and adventure of gold has been destroyed by twentieth century commercialism.

Some sixty years ago, Williams Creek, near Camerontown, in Cariboo County of British Columbia, was the scene of a gold rush that swelled the camp of Barkerville to a town of 25,000 people in a few days. The strike was rich. Everything boomed; prices included. Potatoes at $90.00 a sack, dried apples $2.50 per pound, flour $300.00 a barrel and other prices in proportion, enabled merchants to make as much profit selling commodities as the lucky ones did panning gold. Then the gold apparently petered out. The town dwindled down to a population of a few hundred, who stayed on—hoping.

Recently the scene was reenacted. Reports of more gold came to the outside world, and the old overland trail, hardly trod in sixty years, again swarmed with would-be millionaires. This time though, the trail carried but a part of the army advancing on Barkerville. They came by boat, train and air. Planes rushed agents of commercial backers to the scene bringing in equipment preparatory to going after the yellow metal in a big way.

"That's gold in them thar hills," has been interpreted literally by gold mining companies and they are prepared to move the hills to get it. Hydraulic miners use powerful streams of water that wash tons of earth down sluiceways to simplify handling it. Others use great dredge-like machinery that scoops up the earth, separates the gold and discards the refuse. Gold-bearing ore must go through a crushing process before the valuable metal can be removed.

But there is still the prospector, no different from his great-grandfather of '49 who roams the hills, digging here and panning there and living on the few dollars a day his efforts bring. Many who were hit by the adversities of the last few years, have managed to survive on the small particles of gold wrested from the hills and streams.

The old-timer looks through the eyes of experience upon the newcomers who are following the path of the rainbow. Perhaps he shakes his head in pity. He knows how soon discouragement and disappointment will overtake most of them, that their bubble of hope will pop with the realization of how well nature withholds her riches. A few may strike wealth, very few. Those whose ardor even disappointment cannot dampen, will probably spend many a year, even the rest of their lives, eking out a poor existence, led on by the constant hope of finding the vein of gold that will make them rich. Then some day they too may look upon others and shake their heads and sigh.

COMPONENT SOCIETY ROSTER

SOCIETY	PRESIDENT	SECRETARY	NEXT MEETING	SUBSEQUENT MEETINGS IF ANY
ADAMS-HANCOCK	Roy H. Thesen, Quincy	H. R. Farwell, Quincy	Macomb	First Tuesday and Wednesday in November.
G. V. BLACK DISTRICT	Ross Bradley, Jacksonville	J. Allen Biggs, Jacksonville		Annual, January.
CENTRAL ILLINOIS	E. B. Strange, Hillsboro	J. H. Hite, Shelbyville	Shelbyville, Feb., 1934	Third Wednesday and Thursday in February.
CHAMPAIGN-DANVILLE	H. S. Foster, Danville	T. T. Weir, Champaign	Danville, March 15	Third Thursday of March and October.
CHICAGO	J. E. Schaefer, 185 N. Wabash Ave., Chicago	Stanley D. Tylman 185 N. Wabash Ave., Chicago	Chicago	Third Tuesday of each month except June, July and August.
EASTERN ILLINOIS	G. F. Corley, Mattoon	W. J. Gonwa, Chrisman	Tuscola, April, 1934	April and September.
FOX RIVER VALLEY	P. J. Kartheiser, Aurora	I. J. Stahl, Leland		Third Wednesday in each month.
KANKAKEE	C. M. Marberry, Gilman	J. Gerchgall, Kankakee		Third Thursday in March and September.
KNOX	R. H. Fell, Galesburg	C. A. Treece, Galesburg		Third Tuesday in each month except June, July and August.
LA SALLE	George E. Mason, Streator	E. C. Gaul, Ottawa	Streator	April and October.
McDONOUGH-FULTON	C. P. Jackson, Macomb	J. D. McMillan, Macomb		
McLEAN	W. A. Roth, Fairbury	A. G. Orendorff, Bloomington	Bloomington	
MACON-MOULTRIE	J. J. Griffin, Decatur	P. B. Berryhill, Decatur	Decatur	Second Tuesday of each month except May, June, July and August.
MADISON	Leroy M. Fink, Edwardsville	H. D. Bull, Jerseyville		February and October.
NORTHWEST	S. R. Neidigh, Freeport	W. D. Van Lone Freeport	Freeport	Three or four each year.
PEORIA DISTRICT	C. Carroll Smith, Peoria	O. B. Litwiller, Peoria	Peoria	First Monday of each month except July, August and September.
ROCK ISLAND	C. W. Peterson, Moline	J. H. Nichols, Rock Island		February, May, September and December.
SANGAMO-MENARD-LOGAN	J. T. Yates, Springfield	Anton Gerster, Springfield	Springfield	Second Thursday in each month except July, August and September.
ST. CLAIR	E. L. Rauth, Belleville	R. C. Kolb, Mascoutah	Mascoutah	Second Thursday in April.
SOUTHERN ILLINOIS	Lester I. Webb, Ashley	Roy R. Baldridge Centralia	Harrisb'g, Ill. March, 1934	Semi-Annual — March and October.
WABASH RIVER	G. C. Prichett, Mt. Carmel	D. Z. Wylde, Oblong		Annual — Second Wednesday in October.
WARREN	Cara D. Campbell, Stronghurst	E. B. Knights, Monmouth	Monmouth	Fourth Monday of each month except June, July and August.
WHITESIDE-LEE	Grover C. Moss, Dixon	H. D. Burke, Dixon	Dixon, April 6	May and December.
WILL-GRUNDY	E. J. Drenning, Joliet	Hubert Kelly, Joliet	Joliet	Second Thursday in January, March, May, September, November and December.
WINNEBAGO	L. K. Minshall, Rockford	Paul I. Berg, Rockford	Rockford	Second Wednesday in each month except June, July, August and September.

The PROGRESS *of* SCIENCE IN TREATING PAIN

1 First came salicylic acid. Amazingly beneficial for pain, but not practical because even a small dose had a tendency to upset the stomach.

2 Then came a form of salicylic acid known to the profession as acetylsalicylic acid or aspirin. This was a decided improvement.

3 Now comes POLORIS TABLETS, a superior formula containing acetphenetidin, acetylsalicylic acid and other valuable ingredients, perfectly balanced. The therapeutic action of this new remedy takes place *in the duodenum*, instead of the stomach. Consequently, gastric distress and stomach irritation are avoided. The heart is not affected. They are non-narcotic and non-habit forming. Quicker relief is obtained.

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Interesting Trade News and Gossip

The Dental Equipment Companies Dental Laboratories and Allied Industries.

GOLDSMITH BROS. ARE MOVING

On April 15th Goldsmith Bros. Smelting & Refining Co. are moving their general offices to the 11th Floor of The Garland Building, 58 East Washington Street, Chicago.

At the new address the company will have larger and more adequate facilities to take care of its increased volume of business.

The tooth and precious metals departments will occupy the front suite, and the balance of the space, which occupies practically half of the 11th Floor, will house the purchasing department, general offices, shipping department, and stock rooms.

Prominent in the plans for the new space is a modern, completely equipped technical and research laboratory, in charge of skilled technicians. The laboratory trade and the dental profession at large are invited to present their prosthetic, metallurgical and kindred problems.

Goldsmith Bros. started their refining business more than sixty years ago at old 63 Washington Street, and after 30 years at Madison Street and Wabash Avenue are back on the street of their origin.

In addition to its new quarters the company owns and operates one of the largest smelting and refining plants in the world, devoted to precious metals and allied products. The main plant is at 58th, 59th, Throop and Ada Streets, in the Englewood district on the South Side of Chicago. Subsidiary plants are at New York and Toronto.

The 10th of the Month

IS THE

Closing Date

for receiving Advertising copy for the month in which it is to appear.

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In every neighborhood in the largest cities and in each of the smaller cities is a local laboratory ready to serve you promptly and efficiently. The man in charge is a friend and neighbor of yours and is as interested in the success of your practice as you are. He will go out of his way to help you and will give that distinctive personal touch to your work that makes your practice stand out from the crowd.

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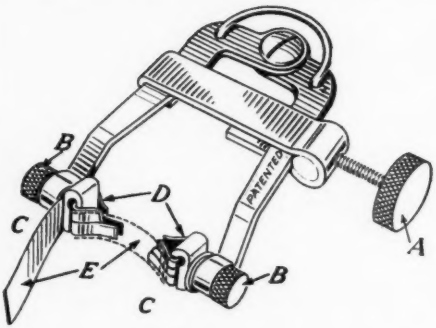

Fig. 1

E. indicates matrix band inserted at base of wedge which is bent to position of dotted lines to be carried to place between the teeth.

With the simple turning of the screw A. the matrix is adjusted to perfect anatomical form and solidly tight margin apposition, a filling that requires no trimming or disking.

HARPER'S ANATOMICAL MATRIX HOLDER AND SEPARATOR

Complete with matrix material
$6.00

The use of Harper's quick setting alloy and Anatomical Matrix Holder and Modernized Amalgam Technic will assure the most perfect and permanent amalgam restorations possible with an assured saving of **one-third** of our valuable operating time.

A reprint of a Modernized Amalgam Technic will be sent free upon request sent to my home address.

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Dr. Wm. E. Harper, 6541 Yale Ave., Chicago

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A New Degree of Perfection Attained!

Each case has the benefit of anatomical construction. The approximation of normal functional movements that is obtained is assurance of removing from the patient all signs of denture consciousness. Monroe Dentures also have the further advantage of long vulcanization, thereby producing a stronger, denser case.

Regardless of your denture problem—Vulcanite-Plastic Materials—Full Gold Palates; we are in a position to guarantee the finest.

PROFESSIONAL PROTECTION

"Some may wish you Peace and Ease
A smoother path in the year ahead.
We wish you Fiber the Valiant need
To force your way through bitter blasts;
We wish you the heart of the Fighting Breed
To carry you on while the battle lasts."

"THE FIGHTING COMPANY"

THE
MEDICAL PROTECTIVE COMPANY
OF FORT WAYNE, INDIANA
WHEATON, ILLINOIS

Picking Winners

A Quarter of A Century Ahead

Sports writers, baseball, football, racing and fight experts are faced with the task of picking winners a day or two in advance of impending events.

Usually they have at their command plenty of "dope" in the form of past records, batting averages, comparative scores, etc., upon which to base their predictions.

A merchant, too, is confronted with the problem of "picking winners." His task is even more difficult. Many times the products that he "bets on" are new, and he has no record of past performances to help him in his decision. His selections cannot be made a day or two in advance, but in most instances his success or failure is dependent upon his ability to look *years* ahead and pick lines of merchandise which possess the inherent qualities necessary to win the approval and permanent patronage of his customers.

Twenty-five year ago our company had the foresight, or plain good luck (call it what you please) to select among other "winners" two lines that have become outstanding—"Steeles Facings" and the "Twentieth Century—Solila—Trubyte" line of teeth.

The steadily increasing merit put into these two lines by their producers, plus the enthusiasm and energy with which they were introduced to the profession by the dealers and laboratories who believed in them increased their popularity to such an extent that other dealers who for many years had opposed them with every means at their command were at last compelled to recognize their merit by stocking and offering them for sale.

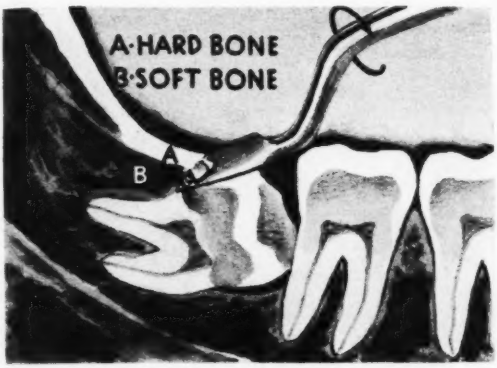
It is a commendable trait in human nature that most folks feel that a person or concern that has played an important part in accomplishing a worthy objective or in introducing a superior product is entitled to such benefit as may accrue through the successful outcome of such a project.

Fair as this may be, our company solicits your continued tooth patronage, not on a "prior claim" or "we saw them first" basis, but upon our ability to render a superior service. We pledge that the loyalty and spirit of fair play which you are evidencing by your continued patronage will be repaid by the type of goods and service you have come to expect from those with the foresight or good fortune to "pick winners a quarter of a century ahead."

C. L. FRAME DENTAL SUPPLY COMPANY

17th Floor Mallers Bldg. Chicago, Illinois

For the GENERAL PRACTITIONER



Showing one of the new instruments at work on a lower left impacted third molar.

A new method of removing impacted teeth . . .

This method is a complete reverse of all other methods

This new method is founded on the histo-anatomic relationship of the crown (enamel) of an impacted tooth to the peculiar bony formation around it—there is always an encapsulated space around the crown (enamel) of an impacted tooth.

The bone cutting instruments (Xcorevators) designed for this new method, take advantage of this space. After the gum tissue has been deflected, an instrument is wedged in the space between the bone and the crown of the impacted tooth.

A twisting or semi-turning motion of the instruments thus engaged permits the cutting edge of the blade to **core out** and **enlarge** the encapsulated space.

The hard top layer of bone—the cortical bone—is dense—and very difficult to cut from the outside. It is this fact that made the removal of impacted teeth so difficult heretofore.

In this new method the hard outside layer of bone is undermined—after which it is easily removed. Only enough of the hard cortical bone is removed to permit the tooth to be extracted or elevated. Dr. Donald J. McDaniel, Exodontist of Chicago, is the author of this new technique and is the designer of the new instruments used in conjunction with the method.

NOTE: Hard and soft bone also encapsulated area. The anatomical structures taken advantage of in this new method.

The use of these instruments will return, in prestige and as a practice builder, many times the original cost of $30.00 — for a complete set of six Xcorevators, operative instructions and routine post-operative treatment.

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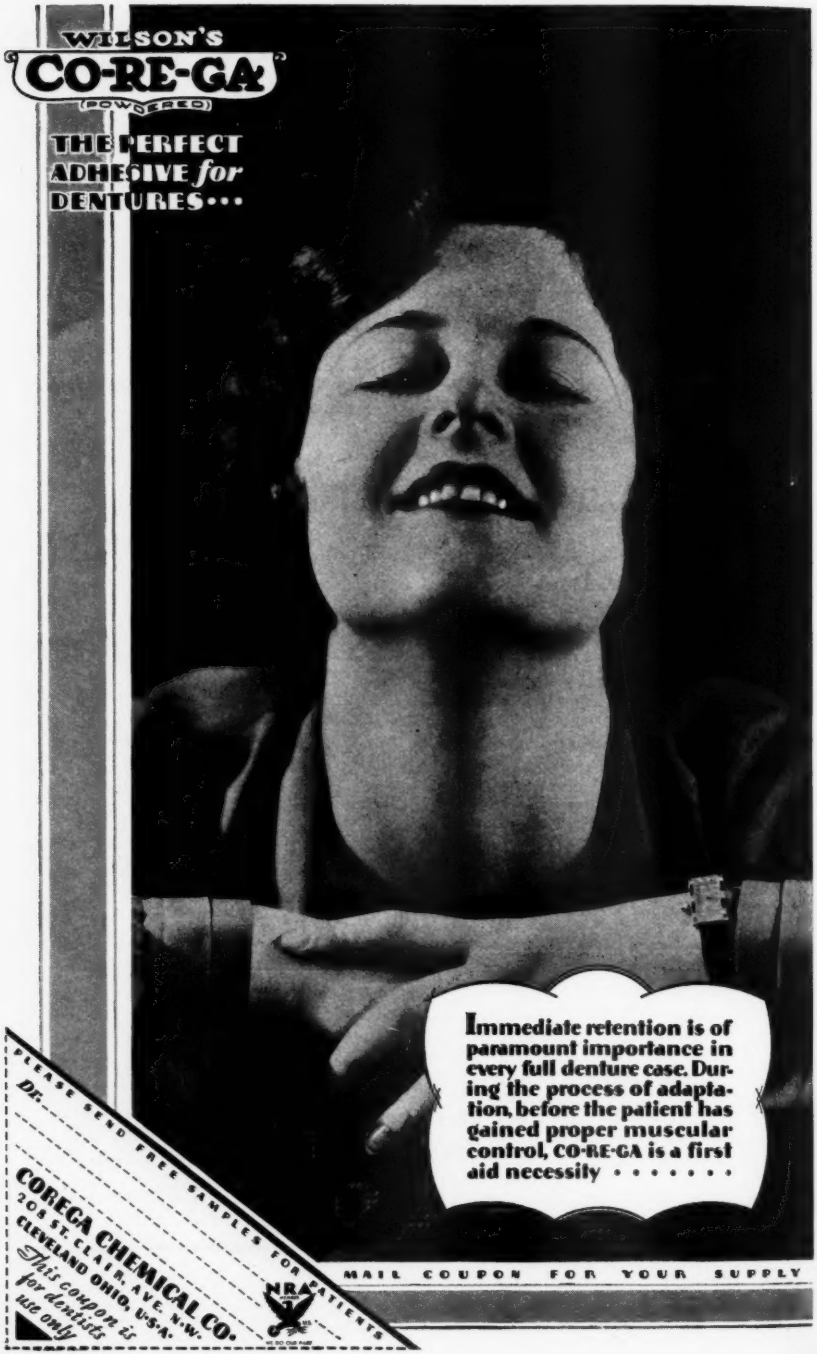
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Tooth Brushes—The CHAS. M. BANTA Tooth Brush. Made for Service or real brushing, with genuine Bristles, silver drawn tufts. Rigid handle. Made in England. Imported and distributed by CHAS. M. BANTA DENTAL SUPPLIES, 1600 Marshall Field Annex, Chicago.

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The entire oral cavity is benefited by Ipana. It not only cleans the teeth and brings out their natural brilliance, but its stimulating effect wakes up lazy gums. Ipana tones and strengthens them and the tingling after feel is highly refreshing to tired soft tissues whether it be in the afternoon, morning or night.

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Calcareous deposits, salivary debris, thick ropy saliva yield to the corrective influence of Sal Hepatica.

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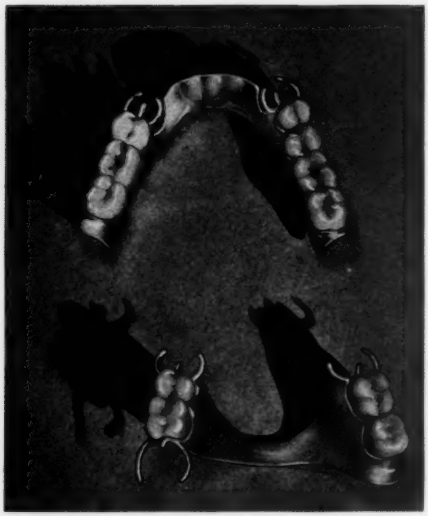

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We COMBINE *the best features of cast work with wrought wire clasps . . . . . .*

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ONE of the most notable features of Oralium is the manner in which it keeps its platinum color in the mouth. No special treatment is necessary to maintain that color. It is inherent in the alloy.

We have often made the statement, and we repeat it, that any metal denture is improved by covering it with a deposit of rhodium. The reason for this is not that a good precious metal alloy will discolor. The reason is that rhodium is the whitest and most brilliant of *all* metals and one of the very hardest. It is absolutely tasteless. Rhodium is to dentures what chromium is to motor cars. It cannot be applied to base metal.

Rhodium resists the action of any acid, including *aqua regia*. If it were not so rare and if it could be used alone, it would make dentures such as never have been seen. It is impossible to use it so, but its qualities of brilliance and ultra hardness can be utilized for surfacing.

OUR WORDS HAVE BEEN TWISTED

It has come to our notice that our words have been twisted by competitors to mean that Oralium cannot be used without rhodium protection. In some cases this has been done by inference only. The implication is more than unfair. *It is positively untrue.* Rhodium is no more necessary with Oralium than with any other dental alloy. We advocate rhodium protection for *all* precious metal dentures—not to hide anything but to give them a lustre and hardness obtainable in no other way.

We originated Oralium to meet the gold situation. Its price is lower than that of casting gold before the rise. It is patented. A host of imitations have sprung up and an attempt is being made to have the tail wag the dog by claiming superiority of the imitations over the genuine.

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